Coping with Multiple Sclerosis: Reconciling significant aspects of health-related quality of life

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Coping with Multiple Sclerosis: Reconciling significant aspects of health-related quality of life

Multiple sclerosis (MS) symptoms and unpredictability can damage patient well-being. This study is aimed to investigate the relation between sociodemographic and clinical characteristics and the use of coping strategies as well as social support on health-related quality of life (HRQOL). We evaluated 314 MS outpatients of Virgen Macarena University Hospital in Sevilla/Spain (mean age 45 years, 67.8% women) twice over an 18-months follow up period by Brief COPE Questionnaire (COPE-28), Multidimensional Scale of Perceived Social Support (MSPSS) and 12-Item Short Form Health Survey (SF-12). Female gender was significantly related to religion ($r=0.175$, $p<0.001$), self-distraction ($r=0.160$, $p<0.001$) and self-blame ($r=0.131$, $p<0.05$). Age correlated positively with religion ($r=0.240$, $p<0.001$), and self-blame ($r=0.123$, $p<0.05$). Progressive MS as well as functional impairment (EDSS) showed a positive relation with denial ($r=0.125$, $p<0.05$; $r=0.150$, $p<0.001$). Longer duration since diagnosis was related to lower perceived support from family ($r=-0.123$, $p<0.05$). EDSS ($\beta = -0.452$, $p < 0.001$) was the strongest negative predictor of physical HRQOL followed by age ($\beta = -0.123$, $p < 0.001$), whereas family support was a protective factor ($\beta = 0.096$, $p < 0.001$). Denial ($\beta=-0.132$, $p< 0.05$), self-blame ($\beta=-0.156$, $p<0.05$), female gender ($\beta=-0.115$, $p<0.05$) and EDSS ($\beta=-0.108$, $p<0.05$) negatively impacted on mental HRQOL 18 months later, whereas positive reframing ($\beta=0.142$, $p<0.05$) was a protective factor. Our study could identify sociodemographic and clinical variables associated with dysfunctional coping strategies, such as self-blame and denial, which specifically predict worse mental HRQOL as opposed to positive reframing. Diminishing dysfunctional coping and supporting cognitive reframing may contribute to improve HRQOL in MS.

key words: Multiple Sclerosis; Coping Strategies; Social Support; Health Related Quality of Life; risk and protective Factors

Introduction

Coping strategies play an essential role in adaptation to multiple sclerosis (MS) and Carnero Contentti et al. (2021) point out a negative relationship between maladaptive coping and HRQOL. Carver (1997) divided coping strategies into three categories: problem-focused, emotion-focused, and dysfunctional coping. Generally, active coping, problem solving, planning, positive reframing, acceptance, emotional and instrumental social support were related to a higher HRQOL in MS. Whilst, avoidance, behavioural disengagement, self-distraction, denial, emotion-focused, self-criticism and venting were associated with lower HRQOL (Gil-Gonzalez et al., 2020).

Particularly, Bassi et al. (2021) found a negative association between avoidance coping and physical HRQOL. In addition, Cerea et al. (2021) discovered a positive association between mental HRQOL and problem solving and a negative with emotional discharge and passive coping (Cerea et al., 2021; Krstić et al., 2021). The scientific literature revealed that MS patients use less active and more avoidance and emotional coping than the general population (Keramat Kar et al., 2019).

In dealing with MS, intrapsychic and interpersonal mechanisms are closely intertwined. A study by Homayuni et al. (2021) found that MS patients described coping strategies and social support as HRQOL facilitators. In fact, social support has been related to improvements regarding fatigue (Mikula et al., 2020), pain (Alphonsus & D'Arcy, 2021), depression and anxiety (Hanna & Strober, 2020; Mikula et al., 2020; Ratajska et al., 2020), thereby also protecting employment (Iwanaga et al., 2018). Social support also influences patients' attitudes on medication selection as they consider significant others' opinions (Visser et al, 2020). In summary, there is evidence that

directly and/or indirectly higher social support is related to better HRQOL (Bassi et al., 2021; Dębska et al., 2020; Gil-González et al., 2020; Kever et al., 2021; Ratajska et al., 2020), while lower social support is related to worse HRQOL (Costa et al., 2017; Strober, 2018).

The present study aimed at investigating (1) sociodemographic and clinical factors underlying coping strategies and social support in adults with multiple sclerosis (MS), and (2) the role of coping strategies and social support as well as sociodemographic and clinical factors as predictors for quality of life in MS over an 18 months' follow-up period.

Method

Participants and procedures

The sample was recruited between June 2017 and May 2018 (T1), and December 2018 and December 2019 (T2) at Virgen de la Macarena University Hospital in Sevilla/Spain. Inclusion criteria were: (1) confirmed MS diagnosis; (2) age over 18, and (3) mental, physical and cognitive capability to participate and sign informed consent. The study was approved by the responsible Ethics Committee (0846-N-18).

Instruments

Clinical and sociodemographic information were collected from the medical data base and a questionnaire.

Coping strategies

The Spanish version of Brief COPE Questionnaire (COPE-28) was applied to study the patients use of different actions in dealing with stressful situations (Morán et al., 2010).

COPE-28 has 28 items grouped into the following 14 dimensions: (1) acceptance; (2) emotional support; (3) humor; (4) positive reframing; (5) religion; (6) active coping; (7) instrumental support; (8) planning; (9) behavioral disengagement; (10) denial; (11) self-distraction; (l2) self-blaming; (13) substance use; (14) venting. Items are scored on a four-point Likert scale (from 0 to 3). Higher scores indicate greater use (Carver, 1997). Cronbach's alpha ranged from 0.60 to 0.88 for the 14 subscales.

Social Support

Participants perception of social support was measured by the Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS comprises 12-items scored on a 7-point Likert scale ranging from 1 to 7. The total score varies from 12 to 84 (Arechabala and Miranda, 2002; Zinnet, 1988). Cronbach's alpha in our sample ranged from 0.91 to 0.96 for the subscales.

Health related Quality of life

The 12-Item Short Form Health Survey (SF-12) consists of 12 items scored on a 3 or 5-point Likert scale. The SF-12 consists of eight domains: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional and mental health. Subscales scores range from 0 (worst) to 100 (best). These subscales are combined to form the Physical Component Summary Score (PCS) and the Mental Component Summary Score (MCS) (Vilgaut et al., 2008; Ware et al., 2002). In our sample, dimensions Cronbach's alpha ranged from 0.70 to 0.96 at T1 and from 0.64 to 0.96 at T2. Cronbach's alpha for the PCS and MCS was 0.92 and 0.88, respectively (Maruish, 2012).

Statistics

Pearson and Spearman correlations are presented for coping strategies/social support and clinical/demographic variables.

Stepwise regression analyses identify quality of life predictors and determine their relative contribution. Two multivariate models were built with MCS and PCS scores at T2 as dependent variables. Sociodemographic (gender, age, partnership, educational level and occupation), clinical variables (EDSS, MS subtype, months since diagnosis and months since the outbreak), coping strategies and social support at T1 were considered as predictors.

All tests were computed using SPSS-v26. Significance level was set to $p< 0.05$. Effect size coefficient were calculated using G*Power Software. Coefficients were interpreted according to Cohen (1988) guidelines; for correlations: $p \geq 0.10$ small, ≥ 0.30 medium, and ≥ 0.50 large effect and in multiple regression: f2 ≥ 0.02 small, ≥ 0.15 medium, and ≥ 0.35 large effect.

Results

The final sample comprised 314 MS patients (dropout rate 19.69%; see figure 1).

-Figure 1-

As can be seen in Table 1, the sample was composed of 213 (67.8%) females and 101 (32.2%) males. Mean age was 45.31 years (±10.77), range from 19 to 78 years. The predominant MS type was remittent 272 (86.6) and mean EDSS score was 3.17 (±1.92).

-Table 1-

Sociodemographic/clinical variables and coping strategies

Female gender correlated with higher use of self-distraction (r=0.160, p<0.001), religion

(r=0.175, p<0.001), and self-blame (r=0.131, p<0.05). Age also correlated positively with religion (r=0.240, p<0.001), and self-blame (r=0.123, p<0.05). Higher educational level was related to a higher use of planning (r=0.167, p<0.001), seeking emotional support (r=0.119, p<0.05), and venting (r=0.151, p<0.001). Being unemployed was related to a lower use of venting (r=-0.121, p<0.05) and higher use of denial (r=0.133, p<0.05) as well as religion (r=0.112, p<0.05).

Progressive MS subtype showed a negative relation with venting (r=-0.134, p<0.05) and a positive relation with denial (r=0.125, p<0.05).

Months since diagnosis positively correlated with self-blame (r=0.147, p<0.001), as well as months since the outbreak (r=0.143, p<0.05), which also correlated negatively with active coping (r=-0.115, p<0.05).

EDSS was related to a higher use of behavioral disengagement (r=0.112, p<0.05), denial (r=0.150, p<0.001), substance use (r=0.124, p<0.05), and humor (r=0.120, p<0.05).

There were no significant correlations in regard to partnership status in the use of coping strategies.

Effect sizes coefficients (*p*) of significant correlations ranged from 0.33 to 0.48, medium effects (Table 2).

- Table 2-

Sociodemographic/clinical variables and perceived social support

Age (r=-0.130, p<0.05) and progressive MS subtype (r=-0.114, p<0.05) were negatively related with social support from friends (see Table 3).

Being without a partner showed a negative relation with social support from significant others (r=-0.128, p<0.05).

Higher educational level (r=-0.119, p<0.05) and longer duration since diagnosis (r=-0.123, p<0.05) was related to lower perceived support from family.

With regard to gender, occupation, months since diagnosis outbreak and EDSS no significant associations were found with social support. For significant results correlation effect sizes (*p*) were medium (from 0.34 to 0.38).

- Table 3-

Physical and mental HRQOL predictors

EDSS (β=-0.452, p<0.001) was the strongest negative predictor of PCS followed by age (β=-0.123, p<0.001). Higher EDSS and older age were related to lower PCS 18 months later. On the contrary, the variable family support (β=0.096, p<0.001) led to an increase of PCS (Table 4). All variables together accounted for 27.4% of PCS variance, with a large effect size (f2=0.377).

Denial (β=-0.132, p<0.05), self-blame (β=-0.156, p<0.05), female gender (β=-0.115, p<0.05) and EDSS (β=-0.108, p<0.05) negatively impacted on MCS 18 months later, whereas positive reframing (β=0.142, p<0.05) was a protective factor. All variables in the model together explained 10.1% of MCS, with small effect size (f2=0.112). (See Table 4).

-Table 4-

Discussion

HRQOL in MS depends on a wide spectrum of factors, which yet have to be fully understood. The present study explored associations and predictive value of sociodemographic and clinical features alongside coping strategies and social support for HRQOL in MS over an 18 months follow-up period.

Sociodemographic/clinical variables and coping strategies

Female gender positively correlated with religion as an emotion-focused coping-strategy. The tendency of females to use emotion-focused coping strategies in MS is supported by previous researches (Holland et al., 2019; Zengin et al., 2017). Particularly, Zengin et al. (2017) found females to use religion more frequently as a coping strategy than men. Clinically even more important we found significant relationships with the two dysfunctional strategies self-blame and self-distraction. Older age was also related to a higher use of religion and self-blame. Keramat Kar et al. (2019) discussed that older people with MS tend to use religion as a coping strategy. The gender and age-related tendency to self-blame is significant in view of the identification of possible risk factors for maladaptive coping early in the diagnostic process.

Higher level of education was related to a higher use of planning, a problem-focused strategy, and seeking emotional support, an emotion-focused strategy. It can be argued that higher educated MS patients can use their knowledge to choose more effective and adaptive strategies, and make a greater use of social support (Keramat Kar et al. 2019). On the contrary, higher educational level was related to a higher use of venting, classified as a dysfunctional strategy (Carver 1997; Ledesma et al., 2018; Meyer 2001).

Unemployment was positively related to a higher use of religion, an emotion-focused coping strategy (Carver 1997; Meyer 2001) and denial, as well as lower use of venting. Our result confirms previous findings indicating that unemployed MS patients tend to a more emotion-oriented coping style (Keramat Kar et al., 2019), avoidance and maladaptive strategies (Holland et al., 2019; Keramat Kar et al., 2019). The lower use of venting contradicts it.

Surprisingly, similar association between denial and venting were found in progressive MS subtype. The higher use of denial is in line with studies indicating the relation between progressive MS and avoidance as well as maladaptive coping strategies (Santangelo et al., 2021; Keramat Kar et al., 2019).

It has been suggested that in advanced disease stage, patients are overwhelmed with the situation because the disease gets uncontrollable and they are more prone to feel helpless (Santangelo et al., 2021; Wilski et al., 2019). COPE-28 questionnaire asks for venting with two questions that imply active efforts to vent unpleasant emotions. In this line of reasoning the non-expression of negative emotions in patients being unemployed and suffering from progressive disease can be interpreted as an utter sign of helplessness and fatalism.

Longer disease duration was associated with higher self-blame and less active coping. In an advanced disease stage, there might be few actions you can take to improve symptomatology or/and impairments. Therefore, the renouncement of active coping may be favorable in dealing with the disease (Wilski et al., 2019). MS severity was positively correlated with avoidance and maladaptive coping strategies such as behavioral disengagement, denial and substance use corroborating previous results (Carnero Contentti et al., 2021; Holland et al., 2019; Lorefice et al., 2018). One might argue that specific coping styles categorized by Carver as dysfunctional could be beneficial when illness symptoms and progression are uncontrollable (Santangelo et al., 2021; Wilski et al., 2019). Further supporting this idea, we found that people with more unfavorable disease features are more likely to use denial. The ongoing challenge to deal with bad news concerning progressive functional impairment might increase the need for transitional denial as a means to habituate. These considerations speak against the rigid categorization of coping styles as functional and adaptive versus dysfunctional

and non-adaptive to a more flexible, stage and context dependent view on the use of coping styles.

In contrast to earlier findings that point out the association between being in partnership and adaptive coping strategies (Holland et al., 2019), no evidence of that relation was found in our study.

Sociodemographic/clinical variables and perceived social support

Age and progressive MS subtype were associated with less social support from friends. In agreement with these results, Zengin et al. (2017) observed that young to middle-aged MS patients were particularly well supported in terms of social relationships. Previous studies also corroborate that patients with relapsing MS subtype report more social support than patient with progressive MS (Ratajska et al., 2020). Older age often goes along with an increase of disease severity and functional impairments, which can hamper social activities (Costa et al., 2017). Moreover, as physical state declines with disease progression, patients may require more social support and caregiving from health care professionals than from friends (Rommer et al., 2017).

Unexpectedly, people with longer disease duration reported less support from their family. In this line, Lorefice et al. (2018), found less family support with increasing disease duration independently of the level of disability. On the one hand patients' family might be frustrated by the chronicity of the disease and the inability to heal it and need to distance themselves to be able to cope with the situation. On the other hand, it might be that objectively the social support from family does not diminish, however in view of the increase of functional impairments, patients get the inner impression of receiving less support. Furthermore, higher formal education was associated with less family support. This might be explained by the fact, that family ties

loosen with higher education and the social support network diversifies (Assirelli and Tosi, 2013).

Physical HRQOL predictors

Consistent with earlier results, we found EDSS and age to be a risk factor for physical HRQOL (Gil-González et al., 2020). In addition to MS progression, there are reduced physical capabilities related to aging that can deteriorate physical HRQOL. SF-12 physical HRQOL items ask for capabilities and limitations in physical activities, especially motor skills. Consequently, the level of disability measured by EDSS and age highly predicts SF-12 physical HRQOL, as the limitation of motor capabilities is of central importance.

On the other hand, as previously found, our findings indicate that family social support is a longitudinal protective factor for physical HRQOL (Bassi et al., 2021; Dębska et al., 2020; Gil-González, et al., 2020; Lex et al., 2018). Social support has been related with factors that positively influence physical HRQOL such as lower pain (Alphonsus and D'Arcy, 2021), fatigue (Mikula et al., 2020), better motor functions (Kever et al., 2021) and symptoms management (Amtmann et al., 2019). Family support can also have a positive effect on physical HRQOL even through medication choice (Visser et al., 2020).

Mental HRQOL predictors

The first predictor of worse mental HRQOL was denial, followed by self-blame, female gender and EDSS. Fisher et al. (2020) found avoidance coping strategies to predict emotional distress, anxiety and depression. In this line Wilski et al. (2019) showed a positive association between mental HRQOL and acceptance. Consistently, our results point out denial as a risk factor for mental HRQOL. The counterproductive aspects of

complete as opposed to above mentioned transitional denial as defense mechanism to cope with a scary situation are emphasized by numerous theories dating back to the origins of psychodynamic therapy (Freud, 1925). Denial in MS may impact on every aspect of health behaviour, e.g. medication adherence or regular physician appointments (Chandra et al., 2007). The second dysfunctional coping strategy negatively impacting mental HRQOL was self-blame, as found in previous studies (Koltuniuk et al., 2021). Self-blame often is closely associated with a feeling of helplessness and a lack of self-efficacy as well as depression (Zahn et al., 2015).

Regarding sociodemographic predictors, female gender was a risk factor for mental HRQOL. Accordingly, Khader et al. (2019) showed that female MS patients suffer greater mental health impairments. As expected, EDSS was a predictor of poorer mental HRQOL, but its contribution to the mental HRQOL is lower than to the physical. Physical disabilities can impede social activities and endanger social relationships (Costa et al., 2017). Consequently, patients with higher level of disability are at higher risk to suffer from mental distress in the long run.

In accordance with our previous research, positive reframing was identified as the only protective factor for mental HRQOL (Gil-González et al., 2020; Ukueberuwa and Arnett, 2019; Wilski et al., 2019). This finding has important clinical implications as positive reframing is also used as a fundamental psychological technique known as cognitive restructuring in cognitive-behavioural therapy to change the way a situation or experience is viewed. A previous study could show the positive impact of cognitive restructuring on pain symptoms in **multiple** sclerosis patients (Jensen et al., 2011).

Clinical and practice implications

Based on these findings, health care professionals should be sensitized to promote psychosocial interventions to facilitate MS adaptation and HRQOL at the onset of disease. Social skills training is recommended to improve communication and strengthen relationships with significant others. Cognitive behavioral therapy and acceptance and commitment therapy might be helpful to promote protective coping strategies such as positive reframing and acceptance, and prevent from avoidance coping strategies, such as denial and self-blame.

Limitations and strengths

The external validity of the study is limited due to the non-random selection of participants. Moreover, only self-report instruments were used. Nevertheless, our sample is very heterogeneous in terms of sample characteristics. As primary strengths the longitudinal design, the large sample size and the rather low dropout rate can be remarked.

Conclusions

The present findings reveal the importance of patients clinical and demographic features when studying coping strategies and social support in MS. The identification of longitudinal risk and protective factors emphasize the necessity to integrate intrapsychic and interpersonal processes to provide a richer insight into the dynamics of HRQOL in MS and to identify potential therapeutic targets.

Recommendations for future research

Future research is required to further disentangle the complexity of these connections by analysing direct and indirect pathways in longitudinal studies. This could improve the

efficacy of interventions through a more individualized therapeutic approach in MS.

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Table 1. Clinical and sociodemographic characteristics

	T1 Sample N=391	T2 Sample N=314
Gender n (%)		
Male	123 (31.5)	101 (32.2)
Female	268 (68.5)	213 (67.8)
Age (M±SD)	45.66±11.13	45.31±10.77
Partnership n (%)		
No partner	108 (27.6)	85 (27.1)
Partner	283 (72.4)	229 (72.9)
Occupation n (%)		
Employed/In education	135 (34.5)	116 (36.9)
Unemployed	256 (65.5)	198 (63.1)
Educational level n (%)		
Primary education	65 (16.6)	44 (14)
Secondary education	128 (32.7)	102 (32.5)
University or higher	198 (50.6)	168 (53.5)
EDSS (M±SD)	3.38±2.06	3.17±1.92
MS subtype n (%)		
Remittent	326 (83.4)	272 (86.6)
Progressive	65 (16.6)	42 (13.4)
Months since diagnosis (M±SD)	145.31±89.49	145.68±89.56
Months since outbreak (M±SD)	184.90±108.47	186.11±111.18

Table 2. Correlations between sociodemographic and clinical variables and coping strategies

	Active Coping	Planning	Instrumental Support	Emotional Support	Self-distraction	Venting	Behavioral disengagement	Positive Reframing	Denial	Acceptance	Religion	Substance use	Humor	Self-blame
Gender	0.081	0.020	0.045	0.083	**0.160****	0.036	0.047	0.040	0.056	0.021	**0.175****	0.044	-0.039	**0.131***
p	0.28	0.14	0.21	0.28	**0.40**	0.18	0.22	0.20	0.24	0.14	**0.42**	0.21	0.20	**0.36**
Age	0.050	0.025	-0.079	-0.047	0.059	-0.102	0.007	-0.006	0.045	0.073	**0.240****	0.030	-0.020	**0.123***
p	0.22	0.16	0.28	0.22	0.24	0.32	0.26	0.07	0.21	0.27	**0.48**	0.17	0.14	**0.35**
Partnership	0.038	-0.061	0.032	-0.055	0.093	0.029	-0.072	0.077	-0.033	0.072	0.078	0.090	0.022	0.071
p	0.19	0.25	0.18	0.23	0.30	0.17	0.26	0.28	0.18	0.27	0.28	0.30	0.15	0.26
Educational level	0.021	**0.167****	0.090	**0.119***	0.009	**0.151****	-0.092	-0.028	-0.024	-0.109	-0.004	-0.088	-0.061	-0.022
p	0.14	**0.41**	0.30	**0.35**	0.09	**0.39**	0.99	0.17	0.15	0.33	0.06	0.29	0.25	0.15
Occupation	-0.008	-0.031	-0.024	0.002	0.060	**-0.121***	0.077	-0.007	**0.133***	0.032	**0.112***	0.016	-0.055	0.037
p	0.28	0.18	0.15	00.04	0.24	**0.35**	0.28	0.08	**0.36**	0.18	**0.33**	0.13	0.23	0.19
MS Subtype	0.034	0.036	-0.011	0.017	0.075	**-0.134***	0.068	-0.101	**0.125***	0.039	0.073	0.095	-0.028	-0.013
p	0.184	0.19	0.10	0.13	0.27	**0.37**	0.26	0.32	**0.36**	0.20	0.27	0.30	0.17	0.11
Months since diagnosis	-0.095	-0.029	-0.063	-0.073	0.062	-0.071	-0.038	-0.012	-0.092	0.044	0.093	-0.015	-0.020	**0.147****
p	0.30	0.17	0.25	0.27	0.24	0.27	0.19	0.11	0.30	0.21	0.30	0.12	0.14	**0.38**
Months since outbreak	**-0.115***	-0.069	-0.050	-0.005	0.034	-0.101	0.036	-0.038	-0.044	0.028	0.084	-0.033	-0.041	**0.143***
p	**0.34**	0.26	0.22	0.07	0.18	0.31	0.19	0.19	0.20	0.16	0.28	0.18	0.20	**0.38**
EDSS	-0.043	0.001	-0.065	-0.017	0.091	-0.045	**0.112***	-0.003	**0.150****	0.030	0.027	**0.124***	**0.120***	0.059
p	0.20	0.03	0.25	0.13	0.30	0.21	**0.33**	0.05	**0.39**	0.17	0.16	**0.35**	**0.34**	0.24

EDSS, Expanded Disability Status Scale *p< 0.05, **p<0.001, *p*, effect size: ≥ 0.10 small, ≥ 0.30 medium, ≥ 0.50 large

Table 3. Correlations between sociodemographic and clinical variables and perceived social support

	Family	Friends	Significant Others	Total Score
Gender	-0.029	-0.044	-0.064	-0.062
p	0.17	0.20	0.25	0.25
Age	-0.042	**-0.130***	-0.078	-0.106
p	0.20	**0.36**	0.27	0.32
Partnership	-0.098	0.033	**-0.128***	-0.105
p	0.31	0.18	**0.36**	0.32
Educational level	**-0.119***	-0.072	-0.102	-0.074
p	**0.34**	00.26	0.31	0.27
Occupation	0.065	-0.070	0.102	-0.040
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p	0.22	**0.38**	0.30	0.26
Months since diagnosis	**-0.123***	-0.077	-0.039	-0.101
p	**0.35**	0.27	0.19	0.31
Months since outbreak	-0.074	-0.055	0.008	-0.053
p	0.27	0.23	0.08	0.23
EDSS	-0.081	-0.103	0.010	-0.077
p	0.28	0.32	0.01	0.27

EDSS, Expanded Disability Status Scale *p< 0.05, **p<0.001, *p*, effect size: ≥0.10 small, ≥0.30 medium, ≥0.50 large

Table 4. Physical and mental HRQL Multiple linear regression models

	Dependent variable physical HRQOL (PCS)							
	F	R^2	R^2adj	B	SE.B	β	1-β	f^2
Model 1	104.556 (1,312)	0.251**	0.249**	54.737**	1.057		1	0.335
EDSS				-2.912**	0.285	-0.501		
Model 2	56.012 (2,311)	0.265**	0.260**	59.839**	2.357		1	0.360
EDSS				-2.668**	0.300	-0.459		
Age				-0.130*	0.054	-0.125		
Model 3	39.010 (3,310)	0.274**	0.267**	55.446**	3.224		1	0.377
EDSS				-2.626**	0.299	-0.452		
Age				-0.128*	0.053	-0.123		
Family§				0.696*	0.350	0.096		

	Dependent variable mental HRQOL (MCS)							
	F	R^2	R^2adj	B	SE.B	β	1-β	f^2
Model 1	11.736 (1,312)	0.036*	0.033*	48.548**	0.752		0.92	0.037
Denial				-3.477**	1.015	-0.190		
Model 2	9.557 (2,311)	0.058*	0.052*	50.401**	1.017			
Denial				-3.111*	1.014	-0.170	0.98	0.061
Self-blame				-1.737*	0.650	-0.148		
Model 3	8.54 (3,310)	0.076*	0.067*	48.017**	1.391		0.99	0.082
Denial				-2.770*	1.015	-0.152		
Self-blame				-2.082*	0.659	-0.178		
Positive Reframing				1.699*	0.683	0.140		
Model 4	8.538 (4,309)	0.089*	0.078*	52.506**	2.537		0.99	0.097
Denial				-2.702*	1.010	-0.148		
Self-blame				-1.872*	0.663	-0.160		
Positive Reframing				1.716*	0.680	0.141		
Gender				-2.849*	1.350	-0.116		
Model 5	6.910 (5,308)	0.101*	0.086*	54.341**	2.691		1	0.112
Denial				-2.416*	1.016	-0.132		
Self-blame				-1.825*	0.660	-0.156		
Positive Reframing				1.722*	0.676	0.142		
Gender				-2.829*	1.344	-0.115		
EDSS				-0.645	0.326	-0.108		

*p<0.05, **p<0.001, §MSPSS Family Support Score

Figure 1. Study flow-chart.

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Partnership	0.038	-0.061	0.032	-0.055	0.093	0.029	-0.072	0.077	-0.033	0.072	0.078	0.090	0.022	0.071
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Educational level	0.021	**0.167****	0.090	**0.119***	0.009	**0.151****	-0.092	-0.028	-0.024	-0.109	-0.004	-0.088	-0.061	-0.022
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Months since outbreak	**-0.115***	-0.069	-0.050	-0.005	0.034	-0.101	0.036	-0.038	-0.044	0.028	0.084	-0.033	-0.041	**0.143***
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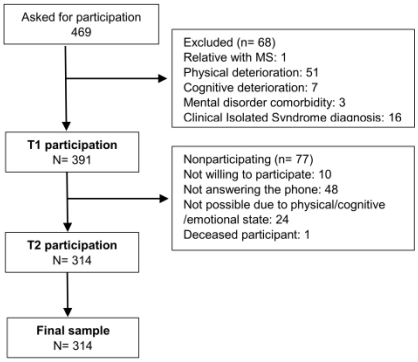
*p<0.05, **p<0.001, §MSPSS Family Support Score



Study flow-chart.

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