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Original Article

Preliminary analysis of an intervention in a psychoeducational group with mixed formats of the self-efficacy variable intervention and neurocognitive training in mild neurocognitive disorder

Analisi preliminare di un intervento in un gruppo psicoeducativo con formati misti di intervento sulla variabile autoefficacia e training neurocognitivo nel disturbo neurocognitivo lieve

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Key words: MCI, Mild Cognitive Impairment, well-being, quality of life, neurodegenerative diseases.

ABSTRACT

Background: due to the "elderly population" increase, it is necessary to talk about memory and multimodal dimensions for primary and secondary prevention of neurodegenerative diseases. Our study aims to evaluate a psychoeducational intervention based on the neuropsychological level and well-being perceived by patients diagnosed with Mild Cognitive Impairment (MCI) and caregivers.
Materials and Methods: to date, 19 patients and 15 caregivers have been enrolled and administered cognitive tests, such as Wechsler Memory Scale (WMS) and GDS, Ben-SSC, and QOL-AD questionnaires.
Results: statistically significant improvements were found between the pre- and post-intervention conditions in auditory, visual, immediate, and delayed memory indices. The correlation between the cognitive status and quality of life was assessed at enrollment, in which a negative linear association was seen in immediate memory (r=-0.5; p=0.043, n=16), and at the end of the intervention, in which indices of auditory (r=-0.5; p=0.043) and delayed memory (r=-0.5; p=0.042) were assessed.
Conclusions: despite study limits, psychoeducational intervention in a population with neurofunctional disorder results in a dynamic and active pathway. This requires involvement between health care personnel and patients/caregivers within a "therapeutic triangle," and its effects seem encouraging.

Background: a causa dell'aumento della "popolazione anziana", è necessario parlare di memoria e dimensioni multimodali per la prevenzione primaria e secondaria delle malattie neurodegenerative. Il nostro studio mira a valutare un intervento psicoeducativo basato sul livello neuropsicologico e sul benessere percepito dai pazienti con diagnosi di Deterioramento Cognitivo Lieve (DCL) e dai caregiver.
Materiali e Metodi: ad oggi, sono stati arruolati 19 pazienti e 15 caregiver, ai quali sono stati somministrati test cognitivi, come la Wechsler Memory Scale (WMS) e i questionari GDS, Ben-SSC e QOL-AD.
Risultati: sono stati riscontrati miglioramenti statisticamente significativi tra le condizioni pre e post-intervento negli indici di memoria uditiva, visiva, immediata e differita. La correlazione tra lo stato cognitivo e la qualità della vita è stata valutata all'arruolamento, dove è stata osservata un'associazione lineare negativa nella memoria immediata (r=-0,5; p=0,043, n=16), e alla fine dell'intervento, dove sono stati valutati gli indici di memoria uditiva (r=-0,5; p=0,043) e memoria differita (r=-0,5; p=0,042).
Conclusioni: nonostante i limiti dello studio, l'intervento psicoeducativo in una popolazione con disturbo neurofunzionale si traduce in un percorso dinamico e attivo. Ciò richiede un coinvolgimento tra il personale sanitario e i pazienti/caregiver all'interno di un "triangolo terapeutico", e i suoi effetti sembrano incoraggianti.

Introduction

Recent decades have seen an epidemiological increase in the so-called "elderly population," and the prevalence of neurodegenerative diseases in the geriatric population is steadily increasing.[1] Consequences of this phenomenon make it increasingly necessary to talk about memory and multimodal dimensions in order to know how the aging process can change the structures and mechanisms that regulate this function for both risk conditions primary prevention and pathology secondary prevention. The neurocognitive decline spectrum ranges from what can be categorized as normative decline, related to physiological aging, to Mild Cognitive Impairment (MCI), which represents the preclinical and transient stage between healthy aging and dementia.[2] MCI refers to a population whose daily functioning is not properly impaired, but they have subclinical and isolated cognitive/mnestic impairment and are potentially at risk of developing Alzheimer's Disease.[3,4]

It seems clear that early accurate diagnosis would allow, in addition to introducing therapies to delay disease progression and improve quality of life, early intervention on the causes of these reversible subclinical conditions and the initiation of therapies that can enhance the patient's cognitive performance. In addition, although a pharmacological treatment that can halt cognitive decline remains unavailable, there are multiple treatments that are capable of delaying the dementia progression, both pharmacological and psychosocial (*i.e.* activities designed to stimulate the person's physical, cognitive, and social components).[5,6] The focus on MCI extends to taking care from a psychoeducational and metacognitive perspective. With these interventions, an attempt is also made to delay the later onset of dementia by promoting preventive factors and reducing risk factors.[7,8]

The boost to carry out clinical activities in a research setting is given by the ever-increasing prevalence of these pathologies, in particular dementia, which mainly affects individuals over 65 years old: it is estimated there will be 131.5 million cases of dementia worldwide by 2050.[9] Moreover, according to World Health Organization (WHO) data,[10] Italy will be one of the countries with the highest percentage of people over 60 years old, with a gradual increase over the years from 13.9% in 1960, to 31.5% in 2023, to an expected increase by 2050 to 42.2% over the national population.[11] Nowadays, the overall number of dementia patients in Italy is estimated at more than 1 million (of which about 600,000 with Alzheimer's), and about 3 million are people directly or indirectly involved in their care, as shown by data from the Tavolo per il Monitoraggio del Recepimento ed Implementazione del Piano Nazionale Demenze 2017.[12] As a consequence, there is an increased likelihood of dealing with such clinical conditions, with obvious economic and organisational implications. The scientific community has reached the conclusion that finding an alternative to pharmacological strategies for cognitive impairment treatment is now a priority[13] in order to set up a caring approach that uses diagnostic criteria, screening tools, and specific and appropriate intervention models able to capture specific features and needs of this population.[14] However, the literature available to date shows discordant results with regard to the long-term effects of cognitive training. There are studies that report a maintenance of improvements after 6 months,[15] 11 months,[16] 2 years,[17] and up to 5 years post-intervention,[18] while others report no maintenance.[19] On the basis of this evidence, it is clear that the use of instruments with solid psychometric properties is the only way to obtain really accurate and consistent data over time. Therefore, particular attention must be paid to updating the trend indices within our psycho-educational pathways aimed at patients diagnosed with MCI, through the use of validity and reliability indices for this population.

EUDERLY study

Building on the analysis of these gaps, the current study aimed to investigate, through a dyadic and longitudinal research design, the effect of a cognitive training intervention in a population of elderly people diagnosed with MCI. Few studies have addressed the need for psycho-educational interventions and their benefits for an elderly population with mild cognitive impairment.[20,21] Some research has highlighted how meta-cognitive and strategic training can lead to positive outcomes in cognitive assessments, meta-cognitive aspects, and post-intervention well-being.[22] However, findings regarding the duration and structure of the sessions remain inconsistent in terms of effectiveness.[15-17] Based on the already e insisting gaps in literature, our study hypothesized significant improvements in memory, particularly in the domains assessed through neuropsychological tests (H1); a practice effect and generalization in the specific tasks examined (H2); and an improvement in overall wellbeing, along with through targeted questionnaires (H3).

Role and impact on quality of life in dementia caregivers

Caregivers have a stressful and challenging task since they often have to balance between patient's requirements and those related to their own personal, social, and working life; not the least, they often experience very negative emotions, such as sadness, worry, discouragement, anger, guilt or powerlessness, and even role reversal. The caregiver's risk is to develop chronic stress, social isolation, poor physical health, and emotional difficulties up to the onset of symptoms such as anxiety and depression.

During a previous rehabilitation project based on the model applied in this study (based on two research grants for Alzheimer's and dementia patients financed by Istituto Superiore di Sanità in 2023) a great deal of attention was paid to the detection of chronic stress in caregivers: the Zarit Burden Inventory (ZBI) was administered to the entire sample both at the beginning (T_0) and at the end of the course (T_1), to detect the level of perceived stress with regard to caring tasks. The failure to process the symbolic aspects related to the trauma of diagnosis leads to greater distress in both the caregiver and the patient, as unexpressed anger prevents any form of awareness regarding the situation. Being deprived of adequate time to process the diagnosis, along with its painful implications, may represent a risk factor associated with increased levels of depression, anxiety, and social isolation. It is essential for caregivers to have a space for emotional support where they can give voice to the trauma, thereby rediscovering the personal and relational resources that had previously been suppressed by feelings of anguish, fear, and anger.[23] Engaging caregivers in psycho-educational groups can help them recognize their role and emotionally attune to the patient's feelings, fostering the development of awareness and self-efficacy constructs, ultimately reducing the risk of burnout.[24,25]

Our primary objective for this study was to evaluate a psycho-educational intervention, with cognitive stimulation strategies and group settings, aimed at a population of MCI patients, based on neuropsychological level and the well-being perceived by patients and caregivers. The main metamodel adopted in the study and clinical

intervention is the life cycle perspective,[26] also considering relevant the caregiver inclusion. Enhancing patients' awareness of both their limitations and their strengths through group intervention could also have an indirect impact on the quality of life of caregivers and their broader family system.[27] In the present study, caregivers were not directly involved in the psychoeducational group, as the intervention was conducted with a population of autonomous older adults, considering the possible reversibility.

Materials and Methods

Study design and population

This was a single-centre, prospective and observational study. Patients with an MCI diagnosis from the Neuropsychology Outpatient Clinic (SSA Psicologia) and the Centre for Cognitive Disorders and Dementia (SOC Geriatria) at the Azienda Ospedaliero-Universitaria SS. Antonio e Biagio e Cesare Arrigo of Alessandria. The recruitment and intervention period for these first patients was between February and October 2023. Patients had taken neuropsychological screening tests, such as Brief Neuropsychological Examination (ENB-3), Adenbrook Cognitive Examination Revised (ACE-R), and Mini-Mental State Examination (MMSE), where no major neurocognitive disorder had emerged. In fact, our study was addressed to at-risk subjects in the elderly population and not clinically impaired patients. These patients had also undergone tests to investigate specific cognitive areas, e.g., Trail Making Test (TMT A, B, G) and attentional matrices (for unichanneled and alternating attention), the Rey Figure in immediate and delayed (for visual-spatial memory).

A total of 19 patients and 15 caregivers were enrolled in this early stage out of the approximately 30 patient population that met the inclusion criteria, based on the total of 70 patients referred to both outpatient clinics in one year. This study used a training model already approved with suitable instruments to identify the multicomponentiality of the memory disorder[28] and then validated on a sample of 11 patients within the framework of additional research already performed.[8]

Patients aged 65 to 85 years who had the ability to access the service independently or attended, who had no dementia diagnosis, and who were normal in cognitive screening tests were included.

Ethical approval

The Institutional Review Board of Alessandria SS Antonio e Biagio e Cesare Arrigo Hospital approved the study (protocol number ASO.Psch.23.01, 06/06/2023).

The collection of an informed consent form specific to the study was foreseen, with a specific form to be submitted to all patients at the time of recruitment.

The study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments and the Good Clinical Practices guidelines.

Instruments for cognitive measurements

Cognitive training

This intervention is part of a psycho-educational model with a group format[28] based on teaching memory strategies that are easily applicable in the context of everyday life. The cognitive training course consists of 12 weekly meetings, each lasting 90 minutes. Each group consists of 10 subjects. The division of the groups was based on the participants' availability and an equal gender distribution. The material for the meetings was taken from the textbook "La memoria degli anziani".[28] Each meeting consists of an initial psycho-educational part, in which the theoretical aspects of memory functioning related to ageing are presented. Exercises are carried out to stimulate mnestic capacities. Exercises are carried out to stimulate mnestic skills: remembering words and figures, remembering places and routes, visual memory (faces and names), remembering texts, and finally, remembering what is to be done in the course of the day (prospective memory). The second part, on the other hand, is devoted to structured exercises for each topic, with a test/retest phase so that any changes in the subjects' performance can be measured. In this training, specific memory strategies, referred to as cognitive strategies, such as categorization, sentence generation, and imagination, were favored.

This can be defined as metacognitive-strategic training, in which a part of metacognition and autogenic training was also included to foster, respectively, reflection and better management of the phenomenon of brooding, often associated with mnesic problems. Autogenic training, specifically, is an important relaxing technique that takes into account the correlation between the body and psyche, including emotions, thoughts, and physiological aspects. Schultz's protocol[29,30] involved a gradual learning of a set of interlinked exercises.

Wechler Memory Scale – IV (WMS-IV)

WMS-IV[31] is validated and administered individually[32] for the memory system assessment in subjects aged 16 to 90 years. The scale consists of 10 subtests. A raw score and a weighted score (z-scores) can be derived for each subtest. The instrument is divided into two separate batteries: Adult Battery, for individuals aged 16 to 69 years, and Elderly Battery, for individuals aged 65 to 90 years. It allows detailed assessment of clinically relevant aspects of memory functioning, so that enhancement/recovery interventions can be defined and any progress assessed.[32]

Instruments for non-cognitive measurements

Well-being and aging questionnaire (Ben-SSC)

Self-report questionnaire aimed to measure well-being level in adult and elderly population.[33] In addition, three specific factors related to the well-being construct can be calculated: personal satisfaction (Ben-sp), coping strategies (Ben-sc) and emotional competence (Ben-ce).

Geriatric Depression Scale (GDS)

Self-report questionnaire[34] investigating depression levels in elderly population. The GDS presents an initial 30-item version. For the current study, a shorter version with 15-item was chosen, investigating how the subjects felt in the last two weeks.[35] The tool's validity is not very high for the Italian sample.[36,37]

Quality of Life in Alzheimer's Disease (QOL-AD)

Self-report questionnaire,[38] short and easy to administer, consisting of 13 questions on a 4-step Likert scale (poor, fair, good, excellent), written in two versions (patient and caregiver). This scale is aimed at measuring the perceived quality of life of both patient and caregiver. An adaptation to the Italian language was used for the current study to take advantage of it.[39] For this work, Cronbach's

alpha was 0.9 (very good reliability) in both patient and caregiver versions.

Zarit Burden Inventory (ZBI)

Zarit Burden Inventory (ZBI)[39] is a widely used interview to assess the caring burden of a family member with a chronic or degenerative disease on the caregiver. It consists of 22 items that investigate how the patient's disability impacts the caregiver's quality of life, psychological distress, guilt, financial difficulties, shame, and social and family difficulties. For this work, Cronbach's alpha was 0.9 (excellent reliability).

Statistical analysis

Data were analyzed in aggregate and anonymously form. A descriptive analysis of demographic, clinical, treatment, and rating scale characteristics was performed on subjects included in the study who had completed all questionnaires.

Missing data, due to their unavailability, were handled by the processing software using the pairwise method (missing data analysis by analysis). However, records with missing data, due to incomplete completion of the questionnaires, were excluded (listwise method) when calculating total scale scores. The respondent base of each variable was always indicated.

Categorical variables were represented as frequencies and percentages, continuous variables as mean and standard deviation, based on the distribution of the data, assessed with appropriate graphs and statistical tests (Shapiro-Wilk test).

Associations between categorical variables were tested using Chi-square, Fisher's, and Cramer's V tests; statistical significance for quantitative data, based on their distribution, was tested in comparisons between two groups (age, gender) with the T-test. For comparison of quantitative data between pre-test and post-test, the T-test for paired data was used.

Pearson correlation index was used to analyze the correlation between two variables. The practice effect was studied using Cohen's d effect size for paired samples (Cohen's for repeated measures).

Cronbach's alpha assessed the internal consistency of the ZBI and QOL-AD in T_0; reliability analysis was not conducted for the other scales used because only data referring to the overall scores were recorded, not those for individual items.

A two-tailed $p<0.05$ was considered statistically significant.

All statistical analyses were performed using the IBM Statistical Package for Social Sciences (SPSS)® version 25 statistical package for Windows.

Results

Nineteen patients, 13 females, and 6 males, aged 47-85 years (mean age 69.84±10.26), joined cognitive training; all patients selected for the intervention were diagnosed with MCI. Females were significantly younger than males (p=0.012). Those were all of Italian nationality. Prevalent schooling level did not exceed the Lower Secondary School Diploma (n=12, 63.1%) (Table 1). Out of 19 caregivers who attended, only 15 of them completed participation in the study.

Cognitive tests

WMS-IV, evaluated on 19 patients, showed a statistically significant difference between pre-and post-intervention conditions on the basis of four auditory, visual, immediate, and delayed memory indices investigated, with Cohen's medium-high values ranging from 0.7 to 0.9. For the fifth index, visual working memory, although considering the low number of subjects included in the count (n=6), a trend toward improvement can still be reported on average (Table 2). In particular, in the subtest "Deferred Visual Reproduction", there is a statistically significant increase p=0.043, although with a small-to-medium effect (Cohen's d=0.50). Other subtests in WMS-IV were found to be not statistically significant (p>0.05).

The IMLV subscale was administered to a very small subsample of patients (6/19). This was the number of patients in the age group

Table 1. Patients' socio-demographic characteristics.

Socio-demographic characteristics	N=19 (%)
Gender	
Male	6 (31.6)
Female	13 (68.4)
Age	
≤65 years	6 (31.6)
>65 years	13 (68.4)
Mean (± SD*)	69.84 (±10.26)
Male	77.17 (±6.05)
Female	66.46 (±10.17)
Last degree	
Primary school	5 (26.3)
Middle school	7 (36.8)
High school	6 (31.6)
Bachelor's degree	1 (5.3)

SD, standard deviation.

Table 2. Patients' cognitive status (WMS-IV).

		Sample statistics in T_0 and T_1 (pre/post intervention)		Paired sample statistics		
Memory indexes	N	Mean T_0 (SD_1)	Mean T_1 (SD_2)	Mean practice effect	p	Cohen's d
Auditory memory (IMU)	19	86.74 (19.32)	92.47 (19.79)	-5.7	0.005	-0.74
Visual memory (IMV)	19	81.21 (15.42)	88.05 (13.58)	-6.8	0.002	-0.85
Immediate memory (IMI)	19	83.8 (17.79)	89.58 (16.19)	-5.7	0.003	-0.79
Delayed memory (IMD)	19	82.37 (16.01)	89.32 (19.36)	-6.9	0.001	-0.92
Visual working memory (IMLV)*	6	85.33 (14.53)	96.67 (10.01)	-	-	-

*Low sample size in study, statistics were not calculated.

(16-69 years) required to use the adult WMS-IV battery. Other patients (13/19) used the elderly WMS-IV battery.

Among 16 of 19 subjects enrolled in T_0, it was possible to assess the correlation between variables representing the total "quality of life" score and "cognitive status," as measured by the indexes investigated in WMS-IV. There was a statistically significant negative correlation (r=-0.5; p=0.043) between the patient's overall quality of life level and immediate memory index, showing the self-perceived quality of life decreases as the immediate memory-related component of the cognitive module increases as well as the other way around. In contrast, auditory (r=-0.5; p=0.079), visual (r=-0.5; p=0.064), and delayed (r=-05; p=0.053) memory indexes are found to be non-significantly related to the quality of life, the same trend is reported for visual working memory index (r=0.3; p=0.678) assessed on 6 subjects.

Correlation between total "quality of life" score and "cognitive status" variables was further evaluated on the 15 subjects who finished the intervention in T_1. Auditory memory (r=-0.5; p=0.043) and delayed memory (r=-0.5; p=0.042) indexes were found to be significantly correlated in a negative direction with patient's quality of life detected in the post-intervention phase, presenting an opposite direction from the starting hypothesis. In contrast, visual memory (r=-0.3; p=0.363) and immediate memory (r=-0.3; p=0.262) indexes didn't show a linear dependent relationship with quality of life in their trend, a tendency also detected for visual working memory index assessed on 6 patients.

Non-cognitive tests

Pre- and post-test scores reported to the GDS, Ben-SSC, and QOL-AD (patient version) questionnaires, used to assess the depressive state, well-being, and perceived quality of life level, respectively, were compared. There was evidence of no improvement in subjects' mean self-assessment in all constructs investigated: mood, well-being, and quality of life. Indices within the cut-off range 5.39 (3.65) versus 4.72 (3.18) were obtained at GDS. In Ben-SSC, a statistically significant difference was noted, although with a discordant trend from the hypothesis hopeful, for the Total score dropping between T0 and T1 from 106.61 (19. 23) to 95.56 (18.83), falling just below the threshold suggestive of a low level of well-being (p=0.014, d=0.65), and for Ben-sc whose index drops from 25.61 (5.28) to 22.78 (3.57) (p=0.019, d=0.61). In contrast, no significant changes emerged for the index of personal satisfaction and emotional competence (p>0.05, d≤0.5).

There was a positive trend, although not statistically significant, and with a small effect size (d<0.5) for patient's quality of life between both assessment phases (Table 3).

The relationship between patients' overall quality of life and their level of well-being (Ben-SSC) pre-intervention among 16 patients was evaluated. Quality of life had a statistically significant positive correlation with total well-being level (r=0.5; p=0.040) and, to a greater extent, with personal satisfaction (r=0.7; p=0.005). Coping strategies (r=0.4; p=0.166) and emotional competence (r=0.3; p=0.331) were found to have a weak and non-significant linear relationship with the patient's quality of life.

In the post-intervention measurement (n=15), personal satisfaction (r=0.8; p=0.001) and coping strategies (r=0.7; p=0.005) were found to have a strong and significant correlation with the patient's quality of life trend. While emotional competence (r=0.5; p=0.100) and total well-being level (r=0.3; p=0.291) did not show a significant and relevant correlated growth. At T_0, quality of life was found to be negatively correlated to a substantial amount with the patient's perceived depression level (r=-0.8; p=0.001), so we can conclude that there is evidence of a dependence between both variables, showing that as quality of life increases, the perceived depression level decreases and the other way around. This trend was also maintained in the post-intervention phase (r=-0.7; p=0.009, n=14).

Correlation between caregiver quality of life and care burden

Among 15 caregivers enrolled, the relationship between perceived quality of life at the end of the intervention and their perceived care burden assessed at baseline was evaluated. However, the negative correlation between both variables was not statistically significant (r= -0.5; p=0.071); in contrast, the inverse dependency relationship was significant and strong with respect to perceived caregiver burden at the post-intervention stage (r= -0.7; p=0.011) (Table 4).

Table 3. Patients' self-report questionnaires.

		Sample statistics in T_0 and T_1 (pre/post intervention)		Paired sample statistics		
Memory indexes	N	Mean T_0 (SD_1)	Mean T_1 (SD_2)	Mean practice effect	p	Cohen's d
Geriatric depression scale (GDS)	18	5.39 (3.65)	4.72 (3.18)	0.67	0.357	0.22
Well-being and aging questionnaire (Ben-SSC)						
Total well-being (Ben-TOT)	18	106.61 (19.23)	95.56 (18.83)	11.06	0.014	0.65
Personal satisfaction (Ben-sp)	18	30.83 (7.92)	28.61 (5.85)	2.22	0.058	0.48
Coping strategies (Ben-sc)	18	25.61 (5.28)	22.78 (3.57)	2.83	0.019	0.61
Emotional competence (Ben-ce)	18	29.61 (4.42)	27.94 (4.48)	1.67	0.141	0.36
Quality of life in Alzheimer's disease (QOL-AD)	15	30.53 (7.67)	31.80 (7.33)	-1.27	0.162	-0.38

Table 4. Caregivers' self-report questionnaires.

		Sample statistics in T_0 and T_1 (pre/post intervention)		Paired sample statistics		
Memory indexes	N	Mean T_0 (SD_1)	Mean T_1 (SD_2)	Mean practice effect	p	Cohen's d
Zarit burden interview (ZBI)	14	18.14 (16.87)	19.57 (11.96)	- 1.43	0.540	- 0.17
Quality of life in Alzheimer's disease (QOL-AD)	14	34.08 (7.05)	34.16 (4.98)	- 0.08	0.968	- 0.01

Discussion

From our work, it was expected that cognitive training intervention, in patients diagnosed with MCI, would show a significant improvement in memory tasks and neuropsychological tests investigated; an increase in patients' well-being with a decreased depression level; and a significant effect on caregivers' perceived quality of life, considering the intertwining of needs and relational dynamics within a complex neurofunctional condition.

Concerning the principal aim, we observed a significant increment, between pre- and post-intervention condition, in memory indexes (IMU, IMD, IMI, IMV, IMLV), investigated through WMS-IV, showing on average an improving trend (even if effect size is small). This increase, however, is not found in patient-perceived quality of life and overall well-being. Thus, there is a discordance between cognitive and emotional dimensions experienced by individual participants. This dissonance is also highlighted by correlations conducted between patient's "quality of life" and his/her "cognitive status", which, although found to be statistically significant, only for some indexes (IMI), show, however, a negative direction. Perhaps the detection of cognitive status, carried out with an objective measuring instrument (WMS-IV), doesn't saturate the variation of MCI patient's perceived quality of life, which, on the other hand, was detected by self-report questionnaires (subjective measure).[8,40]

However, correlations between psychosocial variables, pre- and post-intervention, show encouraging results, although the sample size is small, as only preliminary results are reported here and further enrollment is planned. Indeed, in pre-intervention condition, a statistically significant and positive correlation was found between patients' perceived quality of life, overall level of well-being (Ben-TOT) and personal satisfaction (Ben-sp). Whereas, in post-intervention, patient's quality of life was found to have a significant and positive correlation not only with personal satisfaction but also with coping strategies (Ben-sc). Group increases patients' levels of self-awareness, encouraging greater demand for continuity of intervention and, therefore, showing the usefulness of the preventive function in an at-risk population. Future studies could validate the psychoeducational model so that ongoing care of the patient and his/her familiar system can be implemented.[40]

Such an outcome could mean that meetings facilitate coping strategy learning, which, subsequently, could also have an impact on subjects' perceived quality of life. However, the fact that no significant improvement is found between the two survey times in subjects' self-assessments with respect to the investigated constructs (mood, well-being, and quality of life) could be related to several factors. The unequal nature of the sample, regarding age and constructs investigated, might have generated a feeling of frustration in the group and distrust in their own abilities, undermining self-perception with respect to their own progress. In addition, the small sample size and lack of follow-up do not allow analyses to be conducted with good statistical power and to assess any changes over a longer period of time. In some studies, positive results have been found only after follow-up.[41] In fact, the randomized FINGER trial demonstrates how a large-scale, long-term, multidomain intervention can promote the maintenance of cognitive functioning and reduce the risk of cognitive decline in elderly individuals with MCI.[42,43]

At last, correlations between caregiver quality of life and caregiver burden were not statistically significant, at T_0, in contrast to the literature available to-date.[42] Non significance of collected data may be related not only to a small sample size but also to the difficulty of caregivers in feeling part of this process. Not feeling recognized and legitimized in their "role," made them not perceive a significant change in their lives. Future research could provide caregivers with a listening space where they can bring their fears and concerns that could lower their levels of burden, and consequently also have an effect on their perceived quality of life. Becoming aware of one's caregiving burdens, however, requires the right amount of time in which to process the diagnosis, a process that is essential for a reorganization and rethinking of the relationship with the patient in light of the new event. Making use, in the future, of an Actor Partner Interdependence Model (APIM) would allow the investigation of psychological constructs' interdependence within dyadic dynamics and would help to create greater knowledge with respect to how the needs and expectations of each subject influence the functioning of the entire dyad (patient and caregiver).

The main work limitation is the low sample size, linked, however, to its nature as a preliminary evaluation in the first 19 patients and in all cases representative of the target population for the study estimated to be enrollable in our facilities during the considered period: out of a total of 70 annual patients, only 30 patients were found to be eligible, of these 63% correspond to those who had already been enrolled. It should be added that parametric statistics were used in analyses carried out based on the evaluation of the data distribution, although this may have been affected by the sample size. A second limit exists in the nonhomogeneity of our sample regarding psychological constructs investigated, some patients at T_0 had a higher level of well-being than others; the gender inhomogeneity observed (68.4% women) should instead be interpreted in light of the characteristic of these issues, which intercept the female gender more.[44] However, results obtained suggest fruitful developments for further in-depth studies of this type of intervention, also expanding data collection to the caregiver's socioanagraphic characteristics in order to include them in more detailed analyses. In fact, feedback received from patients during the training course, was positive, characterized by an initial phase of "skepticism", then followed by constant engagement with progress shared even in the family environment. It appears, therefore, functional, for the future, to invest in cognitive training projects that actively involve the entire dyad.

Conclusions

Despite limits induced by clinical and organizational requirements of our hospital, psychoeducational intervention on a population with neurofunctional disorder turns out to be a dynamic and active pathway that requires participation and collaboration among different actors (health care staff, patient and caregiver) within a "therapeutic triangle",[45] the effects of which, although still partial, are encouraging. In addition, it would be useful to introduce a follow-up session so that a reassessment of the subjects' cognitive and social functioning can be carried out months later.

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