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Hypnosis program effectiveness in a twelve-week home care intervention to manage chronic pain in elderly women

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1 Hypnosis program effectiveness in a twelve-week home care intervention to
2 manage chronic pain in elderly women

3
4 Significance

5 **While it has been well documented that hypnosis program can be useful to manage pain**
6 **in young adult population, very few studies demonstrated effectiveness in older people.**
7 **Further, there is no evidence about the possible effect of hypnosis program at home in**
8 **this specific population. The current study showed that a twelve-week hypnosis home**
9 **care intervention lead to relieve pain in elderly women who suffered of chronic pain.**
10 **This approach could be used as a curative or a preventive intervention in older**
11 **population at low cost.**

Abstract

Purpose: While the prevalence of pain increases with age, too much medication could lead to negative side effects. Complementary approaches, such as clinical hypnosis, could be relevant for pain management. While evidence in the literature has shown that clinical hypnosis is effective in child and adult populations, there are few studies in aging populations.

Furthermore, the feasibility and effectiveness of clinical hypnosis in preventive home care for elderly populations suffering from pain has never been established. The goal of this within-subject study was to determine the feasibility and the effects of three 15-min hypnosis sessions delivered during home care interventions over a twelve weeks period in 15 elderly women with chronic pain (mean = 81 years old; range = 65-87).

Methods: Pain was evaluated with the Brief Pain Inventory before and after the period of twelve weeks.

Findings: Clinically significant improvements with large effect sizes were found on worst, average, and current pain perception (p 's < 0.001), pain interference with physical activity and with socio-affective factors (p 's < 0.01). Further, no adverse event was reported during the hypnosis program.

Implications: Altogether, these findings show that a hypnosis intervention is feasible and safe in an elderly population and may significantly help manage pain in this population.

Keywords: hypnosis, aging, home care, pain

Introduction

The prevalence of chronic pain increases with age, reaching 26-86% in 75-84 year olds and 40-79% in over 85 year olds ¹. In this aging population, pain affects fatigue resistance, depression, quality of life, risk of falls, and could lead to loss of autonomy ²⁻⁴. Pain is closely associated with frailty, which represents a major public health problem ⁴. One key aspect of managing pain in the elderly is to reduce the use of medication to prevent adverse effects ⁵. For this reason, alternative and complementary approaches, such as clinical hypnosis, may be key to managing pain and improving quality of life in this population.

The definition of hypnosis given by the American Psychological Association's Division 30 (Society of Psychological Hypnosis) indicates that "one person (the subject) is guided by another (the hypnotherapist) to respond to suggestions for changes in subjective experience, alterations in perception, sensation, emotion, thought, or behavior" ⁶. However, the use of self-hypnosis by the patient is often encouraged following guided sessions. In both cases, a number of research studies have reported that hypnosis decreases pain in many conditions such as abdominal pain, multiple sclerosis, sickle cell disease, transcatheter ablation of cardiac arrhythmias, procedural pain, burns, postoperative pain, and palliative care in adults and children ⁷⁻¹⁰. Although few studies have focused on the use of hypnosis with older adults, all these studies provide evidence of pain reduction ¹¹⁻¹⁴. More specifically, Ardigo, et al. ¹⁴ examined the effects of a three-week hypnosis program (30 min per session per week) on pain perception and pain interference on general activity in older hospitalized patients. The authors reported that hypnosis intervention led to a reduction in both pain and its interference in general activity. From these results, it was concluded that hypnosis could be used safely in a hospitalized aging population to relieve pain. However, pain does not affect only hospitalized older populations, and hypnosis intervention could be used as preventive care. For aging people living at home, it has been reported that home care and community-based services are

57 effective in preventing hospitalization or institutionalization ¹⁵. Consequently, preventive care
58 results in decreased public costs ¹⁵.

59 The main aim of the current study was to assess the effects of three 15-min hypnosis sessions
60 delivered over a twelve-week home care program to manage pain in elderly women suffering
61 from chronic pain. It was hypothesized that hypnosis could relieve the perception of pain and
62 decrease pain interference with general activity in an older population living at home.

Methods

Participants

A flowchart of the study procedure is presented in figure 1. Fifteen participants over the twenty one participants randomized realized the hypnosis home care interventions over a twelve weeks period. Therefore, the data of fifteen elderly women were analysed in the study (mean of 81.4 years ranged 65-87 years). Characteristics of the participants are described in Table 1. All participants were diagnosed as presenting chronic pain since more than 6 months by a geriatric physician specially delegated to home care visits. To be included, participants had to report a pain score higher than 4 on a numerical pain rating scale (0 corresponds to no pain, 10 corresponds to the worst pain you can imagine). All participants had good cognitive capacities with a score of 24 or more in the Mini Mental State Examination (MMSE), except for one participant who scored 19 (Table 1). For that participant, the score was considered good for cognitive capacities and understanding any instructions during the experiment after adjusting for the level of education ¹⁶. All participants received an explanation of the study and provided written informed consent prior to the pre-intervention measures. This study was approved by the institutional ethics review board and complies with the Declaration of Helsinki.

- Please insert figure 1 here -

- Please insert Table 1 here -

Experimental protocol

Figure 2 illustrates the experimental protocol. Participants took part in a “very brief hypnosis treatment” session ⁸ consisting in three 15-min sessions separated by four to six weeks .

Participants were asked to fill the Brief Pain Inventory (BPI) questionnaire, which takes about 20 minutes, before and twelve weeks after the first hypnosis intervention (corresponding to three to five weeks after the third session of hypnosis). Before starting the first hypnosis intervention, the hypnotherapist interviewed the participant in order to understand her pain and the sensations the participant presented. This interview helped the hypnotherapist determine the best strategy to use for inducing hypnosis and provide individualized hypnotic suggestions. All sessions lasted about 15 minutes. The length of the session was less than the 20 minutes recommended by Jensen and Patterson ⁸ because of possible limitations in sustained attention with aging ¹⁷. The participants were asked to call the therapist in the case of adverse events during or after a hypnosis or self-hypnosis session. No adverse event related to the hypnosis program was reported during the twelve-week period.

- Please insert Figure 2 here -

Hypnosis intervention

The three hypnosis sessions were conducted by a psychomotor therapist trained in clinical hypnosis. All these sessions began with the following induction “please sit down as you will be seated when you practice this exercise alone”, and by asking the participant to focus her attention on specific sensations such as breathing or visual cues. Then, suggestions to alter pain perception were provided to the participant. For this purpose, the therapist used the reification hypnotic technique and/or the modification of sensorial perception technique. Finally, post hypnotic suggestions were given to extend the effect of hypnosis on pain and to provide some skills for practicing self-hypnosis. Patients were instructed and encouraged to practice daily. All patients reported using the learned strategies regularly between the visits

from three times a week to daily use. Consistent with a practice effect, hypnotic induction and analgesic effects were achieved faster at the second and third visit.

Pain data

Pain perception and pain interference on general activity were collected from the BPI questionnaire. All participants had to fill in the questionnaire alone, in the presence of the therapist in case of any questions. Excepted for the pre-test, the participants filled the questionnaire alone. The BPI questionnaire is composed of eleven items that could be separated into two categories: pain perception and pain interference with general activity. The part relating to pain perception includes four items and participants were asked to report a score between 0 (corresponding to no pain) and 10 (corresponding to the maximum pain that could be imagined), to best describe the intensity of (i) the worst pain they had in the last week, (ii) the least pain they had in the last week, (iii) the pain perception on average, and (iv) the pain they had right now. The part relating to pain interference with general activity includes seven items and participants were asked to report the number that describes how, over the past week, pain had interfered with their (i) general activity, (ii) walking capacity, (iii) normal work (household), (iv) mood, (v) enjoying life, (vi) relationships with people, and (vii) sleep. The mean pain perception score and mean pain interference with general activity score were calculated. The relationship between changes in the mean pain perception and changes in the mean interference score was also analyzed.

Statistical analysis

All statistical tests were performed with SigmaStat (SigmaStat 3.5, Systat Software, Inc.). Descriptive statistical analysis methods, including means and their standard deviations (SDs), were calculated for each parameter. All data are presented as mean \pm SD. Normality of data

137 was checked using the Kolmogorov–Smirnov test. The paired Student t-test was used for
138 parametric analysis and the Wilcoxon Signed Rank test was used for non-parametric analysis
139 when distributions were not normal. The effect of hypnosis intervention was analyzed using
140 the Student t-test for interference with general activity, walking capacity, normal work,
141 enjoying life, relationships with people, and mean interference score parameters. Wilcoxon
142 Signed Rank was used to determine the effect of hypnosis intervention on worst pain, least
143 pain, average pain, current pain, mean pain perception, and pain interference with mood score
144 parameters. The relationship between changes in the mean pain perception and changes in the
145 mean interference score was analyzed using the coefficient of correlation defined in Pearson
146 statistics. The standardized effect size was calculated using Cohen's d for paired samples,
147 adjusted for the correlation between the T0 and T3M and using Hedge's bias correction ¹⁸.
148 For all analyses, the level of significance was set at $p < 0.05$ (2-tailed).

Results

Results are presented in Table 2.

Pain perception. Statistical analysis revealed a significant decrease in the pain perception score for worst pain (-24%, $p < 0.001$, $d = 1.54$), pain on average (-26%, $p < 0.001$, $d = 1.14$), current pain (-40%, $p < 0.001$, $p = 1.68$), and mean pain perception (-29%, $p < 0.001$, $p = 1.41$). However, the score of least pain was not significantly different before and after hypnosis intervention ($p = 0.206$, $d = 0.53$).

Pain interference with general activity. Results showed a significant decrease in the pain interference score for all items after hypnosis intervention. More specifically, results indicated a significant decrease of pain interference with general activity (-34%, $p < 0.001$, $d = 2.34$), walking (-47%, $p < 0.001$, $d = 2.02$), normal work (-37%, $p < 0.001$, $d = 1.71$), mood (-37%, $p < 0.001$, $d = 1.69$), enjoying life (-44%, $p < 0.01$, $d = 1.30$), relationships with people (-57%, $p < 0.001$, $d = 1.54$), sleep (-46%, $p < 0.01$, $d = 1.07$), and mean interference score (-40%, $p < 0.001$, $d = 2.63$).

- Please insert Table 2 here -

Relationship between mean changes. Our results showed a significant positive correlation between absolute changes in mean pain perception and percentage changes in mean interference scores after hypnosis intervention ($p = 0.028$).

Discussion

The main goal of the current study was to determine the effectiveness of a home care hypnosis program for older adults. The most important clinically relevant finding was that both pain perception and pain interference with global activity significantly decreased after three sessions of hypnosis in a twelve weeks program. These findings support our hypothesis and provide new opportunities for managing chronic pain in the older population.

To date, there has been little knowledge on the effectiveness of hypnosis intervention for relieving pain in the elderly¹⁹. Few scientific studies have been conducted on the impact of hypnosis-related effects on pain in populations over 60 years of age¹¹⁻¹⁴. In particular, it has been established that self-hypnosis in older adults (64-69 years old) provoked a reduction in pain and a reduction in pain medication intake before interventional radiologic procedures and after coronary artery bypass surgery^{11, 13}. In the same way, Gay, et al.¹² reported that older adults with osteoarthritis (64 years old) who had benefited from a hypnosis intervention reduced the amount of analgesic medications for pain management. In the only previous study that focused on the elderly population aged 81 ± 8 years old, Ardigo, et al.¹⁴ used hypnotic techniques during a three-week period of hospitalization. Using the BPI questionnaire, the authors reported that the three weeks of hypnosis program significantly decreased pain perception after three and twelve weeks. Unfortunately, no data on self-hypnosis after hospitalization were reported. In the present study, it was observed that all the participants practiced self-hypnosis, showing a great acceptability and feasibility of this technique.

However, it is difficult to specifically compare our results with those of Ardigo, et al.¹⁴ because the authors did not report all the BPI parameters before and after intervention. Further, data on pain perception were reported for 26 patients before intervention and for 17 patients after twelve weeks. Despite these limitations, the authors concluded that hypnosis is a safe valuable technique for relieving pain in hospitalized elderly people. In this way, no

adverse event was reported in the current study, thereby showing a safe practice for elderly persons at home. The current work corroborates previous research, and provides new insight into managing pain in a preventive process to avoid hospitalization or sedentary in elderly people. In this context, it is worth noting that pain reduction can lead to decreased motor and psychosocial impairments.

In our study, hypnosis intervention reduced pain interference with general activity, walking and household tasks. Otherwise, it has been clearly established in the literature that pain may impair motor control. In fact, nociceptive inputs induce modification of the motor system state, leading to an alteration of muscle activity, force production, motor learning, and activation of the cortical area ²⁰. In a recent study, investigators assessed corticospinal modulation of the lower limbs during a phasic heat cutaneous pain protocol ²¹. Results showed that pain provoked a significant decrease of corticospinal excitability in the dorsiflexor muscles. This study highlighted that corticospinal excitability modulation in pain condition could be responsible of motor control alteration of lower limbs in the presence of pain, which might be related to pain interference during walking or postural control.

Likewise, Lihavainen, et al. ² indicated that elderly populations presenting severe pain showed postural control alterations in comparison with populations without pain. The authors also reported that the risk of falls increased with the severity of pain (odds ratio: 1.29 in mild pain and 2.55 in severe pain). Furthermore, the complex and multidimensional process of pain could involve interactions between fear and motor control, known as the ‘fear-avoidance’ model ²². Fear-avoidance refers to the avoidance of movements or activities based on fear. In a review, Vlaeyen and Linton ²² explained that pain felt in a specific movement, such as back pain in a lifting task, could cause a fear of that movement, e.g. a fear of lifting. Therefore, pain combined with fear reinforces the possible deconditioning syndrome and mobility

limitations. Additional studies are needed to assess the effect that pain reduction produced by hypnosis intervention has on motor control and fear-avoidance in elderly populations. At a psychosocial level, our study outlined that hypnosis intervention was effective for reducing pain interference with mood, enjoying life, relationships with people, and sleep. In particular, it has been reported in the literature that older adults with greater anxiety reported more pain than those with lower levels of anxiety²³⁻²⁵. The same results have been described for pain and depression^{24, 26}. Therefore, decreased pain interference with psychosocial items observed after hypnosis intervention was likely due to the alleviation of pain perception. Similar results have been reported in hospitalized elderly populations after three weeks of hypnosis intervention¹⁴. To explain these results, neuroimaging studies demonstrated that hypnotic suggestions for decreasing pain unpleasantness can impact the anterior cingulate cortex and the prefrontal cortex, which are involved in the emotional brain network²⁷⁻³⁰. The results of the current study support the idea that this process should be functional in older populations and that hypnosis intervention causes a decrease in both pain perception and pain interference with psychosocial factors. Future neuroimaging studies are required to verify the impact and brain mediators of hypnotic interventions used to manage chronic pain.

Conclusion

The current study suggests that hypnosis intervention has an effect not only on pain perception but also interference of pain on motor and psychological factors. Our study demonstrated that hypnosis can be feasible and safe for managing pain in an elderly population, particularly at home. These findings give new opportunities for managing pain to avoid a decrease in pain-related physical activity, fear-avoidance behavior, states of depression, and finally avoid hospitalization and a sedentary lifestyle. Our study also gives new opportunities for managing pain in older populations as curative or preventive home care.

244 Finally, further studies will be required to assess the long-term effects of a hypnosis program
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318 Legends

319

320 Table 1. Characteristics of participants with age, Mini Mental Score Excursion (MMSE), level
321 of education, pain localization and pain type.

322

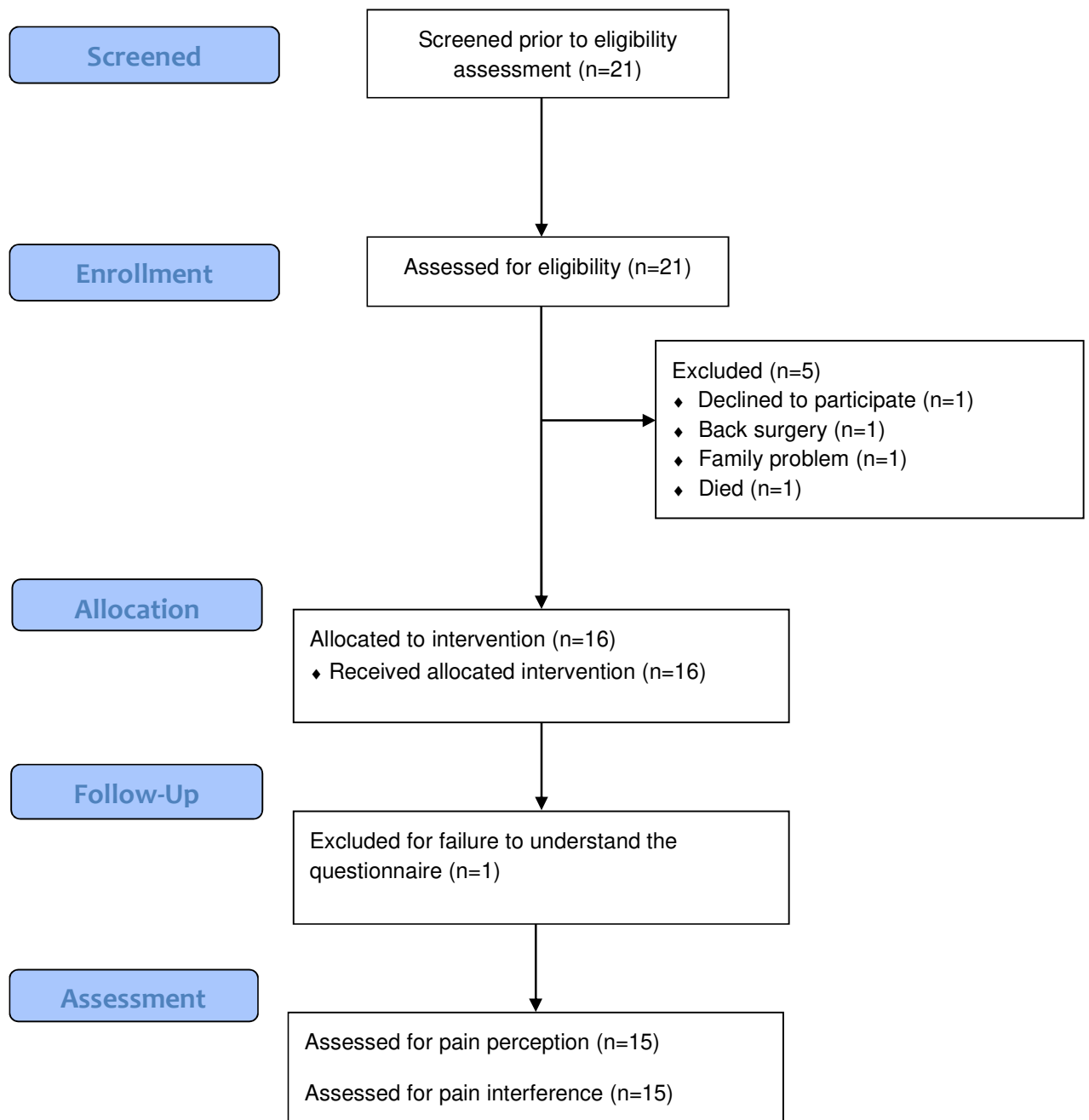
323 Table 2. Pain and interference measures before (T0) and after the intervention (T3M)

324

325 Figure 1. Flowchart of participants included in the study.

326

327 Figure 2. Experimental protocol of hypnosis program. Brief Pain Inventory (BPI)
328 questionnaire was delivered before the first session and twelve weeks after it. Hypnosis
329 sessions were separated by 3 to 5 weeks for every participant.



1 Figure 2.

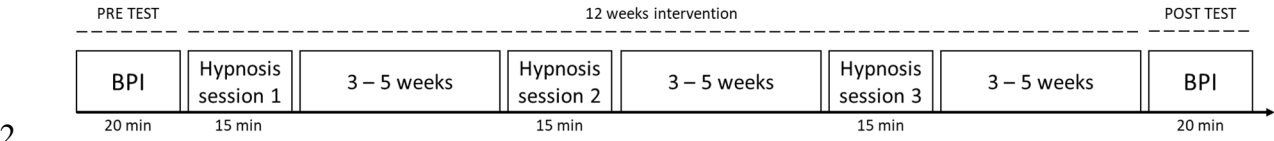


Table 1.

Subject n°	Age	MMSE score	Level of education	Pain Localization	Pain type
1	79	25	5 to 8 years	Right hip + knees	Arthrosis
2	78	30	5 to 8 years	Variable whole body	Arthrosis + Fibromyalgia
3	74	29	≥ 13 years	Upper limb right	Arthrosis + Fibromyalgia
4	83	29	0 to 4 years	Low back	Arthrosis
5	86	29	9 to 12 years	Whole body	Dull pain
6	65	30	9 to 12 years	Low back	Arthrosis
7	78	19	0 to 4 years	Whole body	Arthrosis
8	85	24	5 to 8 years	Whole body	Arthrosis
9	86	28	0 to 4 years	Belly	Neuropathy
10	83	25	5 to 8 years	Shoulder + low back	Vertebral collapse
11	86	24	5 to 8 years	Low back	Arthrosis
12	87	25	9 to 12 years	Right hip + low back	Neck of femur fracture
13	75	28	5 to 8 years	Knee + spine	Arthrosis
14	87	27	5 to 8 years	Cervical vertebrae	Neuralgia
15	84	26	5 to 8 years	Spine	Arthrosis
<hr/>					
Mean ± SD	81.1 ± 6.2	26.5 ± 3.0			

Table 2.

	T0	T3M	Mean Change (Min; Max)	P-value ^a	Effect Size d (CI) ^b
Pain perception					
Worst pain	8.9 ± 1.1	6.7 ± 1.9	-2.1 ± 2.0 (0; -8)	< 0.001	1.54 (0.72; 2.35)
Least pain	3.6 ± 2.0	2.7 ± 1.5	-0.9 ± 2.7 (-4; -8)	= 0.206	0.53 (-0.19; 1.26)
Pain on average	6.8 ± 1.5	5.1 ± 1.5	-1.7 ± 2.1 (0; -8)	< 0.001	1.14 (0.37; 1.91)
Current pain	6.5 ± 2.1	3.9 ± 1.9	-2.6 ± 2.1 (0; -8)	< 0.001	1.68 (0.85; 2.51)
Mean pain sensation score	6.5 ± 1.2	4.6 ± 1.5	-1.9 ± 1.8 (0; -8)	< 0.001	1.41 (0.61; 2.21)
Interference with					
General activity	8.0 ± 1.0	5.3 ± 2.0	-2.7 ± 1.8 (0; -7)	< 0.001	2.34 (1.41; 3.27)
Walking activity	7.3 ± 2.4	4.1 ± 2.3	-3.2 ± 2.2 (0; -7)	< 0.001	2.02 (1.13; 2.90)
Normal work (household)	7.7 ± 1.6	4.9 ± 1.8	-2.8 ± 2.3 (0; -9)	< 0.001	1.71 (0.87; 2.55)
Mood	6.4 ± 2.6	4.1 ± 2.5	-2.3 ± 1.9 (0; -6)	< 0.001	1.69 (0.85; 2.52)
Enjoying life	7.3 ± 2.9	4.5 ± 2.9	-2.8 ± 3.0 (0; -8)	< 0.010	1.30 (0.72; 2.35)
Relationship with people	5.1 ± 2.7	2.2 ± 2.6	-2.9 ± 2.6 (1; -7)	< 0.001	1.54 (0.72; 2.35)
Sleep	5.3 ± 3.5	2.9 ± 2.7	-2.5 ± 3.2 (0; -9)	< 0.010	1.07 (0.30; 1.83)
Mean interference score	6.7 ± 1.6	4.0 ± 1.8	-2.7 ± 1.4 (0; -6)	< 0.001	2.63 (1.65; 3.60)

a. P-value for the within-subject t-test comparing means at T0 and TM3

b. Standardized effect size (Cohen's d) with Hedge's bias correction and adjusted for the correlation between T0 and T3M (CI: lower and higher limits of the 95% confidence interval)