



The Effectiveness of Emotion Regulation Training on Metacognitive Beliefs and Pain Perception in Patients with Functional Indigestion

Leila Ahmadkhani¹, Mohammad Vahidi², Maral Khosravi³, Samira Dehghan-Khalili⁴,
Zohreh Zadhasan²

¹ Assistant Professor, Department of Counseling, Farhangian University of Fars, Shiraz, Iran

² Department of Clinical Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran

³ Department of Clinical Psychology, Pars University, Tehran, Iran

⁴ Department of Family Counseling, Islamic Azad University Marvdasht Branch, Marvdasht, Iran

Corresponding Author: Zohreh Zadhasan; *Department of Clinical Psychology, Ahvaz Branch, Islamic Azad University, Ahvaz, Iran*

Email: zadhasan.zohreh@gmail.com

Quantitative Study

Abstract

Background: The most common gastrointestinal disorders are functional gastrointestinal disorders (FGID) of which functional indigestion is one of the most common types and causes the deterioration of health and reduction of quality of life (QOL). This study was conducted with the aim to determine the effectiveness of emotion regulation training on metacognitive beliefs and pain perception in patients with functional indigestion.

Methods: The present study was a quasi-experimental research with pretest-posttest design and a control group. The statistical population consisted of all patients with functional indigestion in Tehran, Iran, in 2020. The sample consisted of 30 patients who were selected through the convenience sampling method and randomly assigned to an experimental group (emotion regulation training) and a control group (each consisting of 15 people). The research tools included the Metacognitions Questionnaire (Wells & Cartwright-Hatton, 2004) and McGill Pain Questionnaire (Melzack, 1975). Data analysis was performed using analysis of variance in SPSS software.

Results: The findings showed that emotion regulation training was effective on metacognitive beliefs ($P < 0.001$) and pain perception ($P < 0.001$) in patients with functional indigestion.

Conclusion: It can be concluded that emotion regulation training was effective on metacognitive beliefs and pain perception in patients with functional indigestion.

Keywords: Emotion regulation; Metacognition; Pain perception

Citation: Ahmadkhani L, Vahidi M, Khosravi M, Dehghan-Khalili S, Zadhasan Z. **The Effectiveness of Emotion Regulation Training on Metacognitive Beliefs and Pain Perception in Patients with Functional Indigestion.** *Int J Body Mind Culture* 2021; 8(4): 235-43.

Received: 5 May 2021

Accepted: 25 Sep. 2021

This is an open-access article distributed under the terms of the [Creative Commons Attribution-NonCommercial 4.0 Unported License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Introduction

The most common gastrointestinal disorders are functional gastrointestinal disorders (FGIDs) that are the cause of referral to specialized gastrointestinal centers in about 50% of patients (Mahmoudi, Maddahi, Poursharifi, & Meschi, 2019). Functional indigestion has a very high prevalence and is one of the most common types of FGIDs (Pesce et al., 2020). Functional indigestion is diagnosed by the presence of more than 2 criteria of Rome III, including early satiety, heaviness after eating, epigastric pain or irritation for more than 3 months in the absence of organic or metabolic causes (Ford et al., 2021). Indigestion is diagnosed by the presence of more than 4 of the main symptoms of epigastric pain, epigastric irritation, and heaviness after eating, early satiety, excessive burping, nausea, and vomiting. Functional dyspepsia is a psychosomatic disorder that plays an important role in the deterioration of health and reduction of quality of life (QOL) (Aziz, Palsson, Tornblom, Sperber, Whitehead, & Simren, 2018).

It seems that one of the important psychological variables effective in functional indigestion is the perception of disease (Gilbert & Rushton, 2018). Since patients are active processors of their disease, cognitive representations form that which threatens their health, which determines how patients respond to these factors and patients' compatibility with the disease and its symptoms (Sadeh Tabariyan, Ghyasvandian, & Haghani, 2019). Therefore, investigating the role of disease perception in chronic diseases such as functional indigestion is important and effective (Pindado-Ortega et al., 2018). Patients' knowledge of their disease is based on their perception of the disease or cognitive representation of the disease, and the beliefs they form and information they gain from different sources. This factor can affect a person's mental health and ability to cope with the disease (Casale, Rugai, & Fioravanti, 2018).

Metacognitive beliefs are also one of the most important variables in patients with functional indigestion (Unal-Aydin, Obuca, Aydin, & Spada, 2021). The term cognition itself means internal, subjective processes or ways in which information is processed. In other words, cognition means how information is taken into consideration, is recognized, encoded, and ultimately stored at the moment to be called in case of need (Mennin, Fresco, O'Toole, & Heimberg, 2018). The term metacognition was first used by Flavell (1979) in the field of memory. Flavell defined metacognition as how to control cognition. Metacognition is any knowledge or cognitive activity that encompasses a cognitive subject or disciplines a cognitive activity. It is related to people's knowledge about the nature of people as a cognitive system, as well as knowledge about the nature of different cognitive tasks. Metacognitive beliefs are beliefs that a person has about thinking and its processes (Caselli et al., 2018).

Psychological therapies are necessary to balance medical and psychological health and improve outcomes such as reducing psychological distress and improving treatment adherence. In the research literature, psychological interventions, especially emotion regulation training, have been reported to be effective in helping people with functional indigestion cope with the usual stresses of this disease (Cohen & Ochsner, 2018). Emotion regulation training is a process of awareness and perception of emotions, acceptance of emotions, and the ability to control impulsive behaviors (Linhartova, Latalova, Kosa, Kasperek, Schmahl, & Paret, 2019). According to the Gross model (Gross, 2001), emotion regulation includes all conscious and unconscious strategies that are used to increase, maintain, and decrease emotional,

behavioral, and cognitive components of an emotional response, which means the reduction and regulation of negative emotions and to the positive use of emotions. This structure refers to processes that control emotional states by adjusting the intensity and time of emotional experiences, so this adjustment may include suppression, resonance, or preservation of emotions. Researchers have associated deficits in the emotion regulation process with a wide range of malfunctions and disorders, it is expected that emotion regulation training be an effective method for improving undesirable functions in people. Emotion regulation training is one of the interventions and training methods that have been used less educationally and consists of methods to reduce and control negative emotions and use emotions positively, which has a positive effect on reducing symptoms of disorders such as depression, anxiety, and stress (Greimel et al., 2020). Different individual factors affect the mental health of patients. Emotion regulation training is one of the most important variables affecting mental health. Mennin et al. (2018) showed that emotion regulatory therapy had significantly improved anxiety, worry, rumination, and the QOL of participants in the intervention.

Acceptance and commitment therapy (ACT) is a relatively new approach, and previous studies related to the effect of ACT have been performed in the field of mental disorders and common clinical problems. The intervention of this study has been designed as an educational intervention in healthy people, so researchers in this study decided to find out whether an intervention based on the psychological content of acceptance and commitment approach and increasing acceptance, attention to values, determining value-based goals, and taking committed action can have a positive impact on cognitive assessment, death anxiety, empirical avoidance, and emotional expression. Considering the mentioned facts and the importance of the subject, this study was conducted with the aim to determine the effectiveness of emotion regulation training on metacognitive beliefs and pain perception in patients with functional indigestion.

Methods

The present study was a quasi-experimental research with pretest- posttest design and a control group. The statistical population consisted of all patients with functional indigestion in Tehran, Iran, in 2020. The sample consisted of 30 patients who were selected using convenience sampling method and randomly assigned to an experimental group (emotion regulation training) and a control group (each consisting of 15 people). The required sample size was calculated to be 30 in total based on effect size = 0.40, $\alpha = 0.95$, $1-\beta$ (err prob) = 0.80 test power, and 10% possible dropout in each group. The study inclusion criteria included age range of 30-50 years, diagnosis of functional indigestion disease, the passage of 1 month since the acute phase of the disease and not being in an inflammatory phase, lack of any acute diseases, immune diseases, and serious psychiatric disorders, and informed consent for participation in the study. The exclusion criteria included lack of participation in the pretest and posttest, receiving any other psychotherapy interventions before the study, disrupting the treatment process, and absence from 2 consecutive sessions of the intervention.

The ethical considerations were as follows: 1. All people received written information related to the research and participated in it if they wished. 2. The assurance was given to individuals that all information would remain confidential and be used for research purposes only. 3. The names and surnames of the

participants were not registered to protect their privacy.

Metacognitions Questionnaire: The Metacognitions Questionnaire (MCQ-30) is a 30-item self-report questionnaire designed by Wells and Cartwright-Hatton in 2004 to measure people's positive and negative metacognitive beliefs about worry and disturbing thoughts (Wells & Cartwright-Hatton, 2004). The items are scored on a 4-point Likert scale ranging from 1 (I do not agree) to 4 (very much). This scale includes the 5 subscales of positive beliefs about worry, incontrovertible beliefs and risk, beliefs about cognitive adequacy, negative general metacognitive beliefs regarding the need for control, and metacognitive beliefs concerning cognitive self-awareness. All subscales are scored directly and higher scores indicate higher levels in each subscale. To calculate the score of each dimension, the sum of the points related to each of the questions in each dimension is calculated. Shirinzadeh Dastgiri, Goudarzi, Rahimi, and Naziri (2009) translated and prepared this questionnaire for the Iranian population, and reported a Cronbach's verbal coefficient of 0.91 for the whole scale and 0.87, 0.86, 0.81, 0.80, and 0.71 for uncontrollable subscales, positive beliefs, cognitive self-awareness, cognitive confidence, and the need to control negative thoughts, respectively, in the Iranian sample. In this study, the reliability of the whole scale and its subscales was determined to be within the range of 0.76-0.93 using Cronbach's alpha.

McGill Pain Questionnaire: This short form of the McGill Pain Questionnaire (MPQ) is designed by Melzak to assess the quality and severity of McGill's pain dissemination pain to facilitate accountability and includes 15 items that examine the sensory dimension (11 items) and emotional dimension (4 items) of pain (Melzack, 1987). The questionnaire is scored on 4-point scale ranging from 0 (not at all) to 3 (very high). In addition to the sensory pain and emotional pain score, the overall pain score is obtained as the sum of these 2 scales. Higher scores indicate higher pain intensity. Moreover, a visual scale with grading (0 = painless to 10 = torture) is used to examine pain intensity. Melzak (1987) assessed the validity of this tool according to its correlation with McGill's long-pain form. In Iran, several studies have investigated the psychometric properties of this questionnaire. Khosravi, Sadighi, Moradi, and Zende del reported its Cronbach's alpha coefficient to be 0.85 and the reliability coefficient of the sensory and emotional domains to be above 0.8. The reliability of this questionnaire was approved with a Cronbach's alpha of 0.79.

In this research, the group emotion regulation training protocol was developed based on Gratz and Gunderson's research (2006). A brief description of its sessions is presented in table 1.

To describe the data, central indices and dispersions such as mean and standard deviation were used and for analyzing the data, repeated measures analysis of variance (ANOVA) and the Bonferroni post hoc test were used. It is worth noting that to investigate the inferential test assumptions, Levene's test (to investigate the homogeneity of variances), Shapiro-Wilk test (for normalization of data distribution), Box's M test, and Mauchly's test of sphericity were used. To compare the 2 groups in terms of demographic variables (gender, marital status, age, and education), chi-square test was used. The statistical analyses were performed in SPSS software (version 22; IBM Corp., Armonk, NY, USA). The significance level of the tests was considered at 0.05.

Table 1. Content and structure of emotion regulation training sessions

Sessions	Content
First	Introducing the learner, familiarizing the members of the group with each other and establishing an educational relationship, introducing the training and structure of the sessions, implementing the pretest, communicating, and conceptualizing the problem, discussing emotions and their impact on social and individual life, and explaining its role in health and well-being with research evidence
Second	Training on awareness of positive emotions
Third	Training on awareness of negative emotions
Fourth	Positive emotion acceptance training: The basis of this session was positive emotions that the subjects of the group wrote down as a homework after the second session, especially positive emotions that were highly or underreported. In this meeting, the acceptance of all the written emotions was taken into consideration.
Fifth	Training to accept negative emotions: The basis of this meeting was positive emotions that the subjects of the group wrote down as homework after the third session, especially negative emotions. In this meeting, the acceptance of all the written emotions was taken into consideration.
Sixth	Re-evaluation of positive emotions and their expression: In this meeting, adjustment and modification of experiences (mental and behavioral) related to positive emotions were emphasized through emotional expression.
Seventh	Re-evaluation of negative emotions and their expression: In this meeting, adjustment and modification of experiences (mental and behavioral) related to negative emotions were emphasized through emotional expression.
Eighth	In this session, to finish the sessions and perform the posttest, the subjects were asked to apply these emotion regulation techniques in their daily lives to help improve their mental and social health.

Results

The mean \pm SD of age in the experimental group was 42.18 ± 8.72 years and in the control group was 40.93 ± 8.14 years. There was no significant difference between the 2 groups in terms of age ($P > 0.05$). Table 2 shows the mean (SD) of the research variables in the experimental and control groups.

Repeated measures ANOVA was used to investigate the difference in the severity score of symptoms in the experimental and control groups. Before performing repeated measures ANOVA, the results of Box's M, Mauchly's test of sphericity, and Levene's test were evaluated. Since the Box's M test was not significant for any of the research variables, the homogeneity condition of the variance-covariance matrix was properly observed. Moreover, the lack of significance of all of the variables in Levene's test showed that the condition of equality of intergroup variances was observed and the variance of dependent variable error in all groups was equal. The assumption of the equality of variances within the subjects (spherical assumption) was observed (Mauchly's $W = 0.75$; $df = 2$).

The results showed that there was a significant difference between the experimental and control groups in terms of the effectiveness of emotion regulation training on improving metacognitive beliefs and pain perception.

Table 2. Mean (SD) of research variables in experimental and control groups

Variable	Group	Pretest	Posttest	Follow-up
		Mean \pm SD	Mean \pm SD	Mean \pm SD
Metacognitive beliefs	Experimental	60.60 \pm 4.30	66.05 \pm 3.63	65.35 \pm 3.55
	Control	59.95 \pm 4.51	60.50 \pm 4.62	60.45 \pm 4.68
Perception of pain	Experimental	12.80 \pm 1.65	9.80 \pm 1.14	9.13 \pm 1.30
	Control	12.40 \pm 1.45	12.20 \pm 1.12	12.43 \pm 1.40

SD: Standard deviation

Table 3. Regarding the Comparison of pretest, posttest, and follow-up scores of metacognitive beliefs and pain perception in the experimental and control groups using repeated measures analysis of variance

Variables	Source	SS	df	MS	F	P-value	Eta
Metacognitive beliefs	Time	185.08	1.38	133.96	124.71	0.001	0.81
	Group*Time	106.02	1.38	76.73	71.43	0.001	0.71
	Group	263.51	1	263.51	5.87	0.022	0.17
Pain perception	Time	143.11	1.38	122.54	110.94	0.001	0.76
	Group*Time	102.16	1.38	65.20	63.12	0.001	0.68
	Group	220.44	1	220.44	4.03	0.034	0.15

SS: Sum of squares; df: Degree of freedom; MS: Mean of squares

It should be noted that the Wilks' Lambda test with a value of 0.09 and $F = 132.67$ shows a significant difference in the scores of the effectiveness of emotion regulation training on improving metacognitive beliefs and pain perception in the experimental and control groups at a significant level of 0.0001.

The results presented in table 3 indicate that ANOVA is significant for the intragroup factor (time) and is not significant for the intergroup factor. These results mean that regardless of the effect of the group, the effect of time alone is significant. In addition, the interaction between group and time was significant ($F = 71.43$; $df = 2$) with an effect of 0.71. Furthermore, for pain perception, ANOVA is significant for the intragroup factor (time) and not significant for the intergroup factor. These results mean that regardless of the effect of the group, the effect of time alone is significant. Moreover, the interaction between group and time was significant ($F = 63.12$; $df = 2$) with an effect of 0.68. The Bonferroni post hoc test was used to compare the study groups.

The results presented in table 4 show that the posttest score of the metacognitive beliefs variable in the experimental group is higher than in the control group. In other words, the emotion regulation training has been highly effective in improving metacognitive beliefs. The results show that metacognitive beliefs in the follow-up stage in the emotion regulation training group did not increase significantly compared to the control group. The posttest score of the pain perception variable in the experimental group is lower than in the control group. In other words, the emotion regulation training has been highly effective in improving pain perception. The results show that pain perception in the follow-up stage in the emotion regulation training group has not decreased significantly compared to the control group.

Discussion

This study was conducted with the aim to determine the effectiveness of emotion regulation training on metacognitive beliefs and pain perception in patients with functional indigestion.

Table 4. Comparison of the severity of symptoms and perception of disease using the Bonferroni post hoc test

Variable	Group	Steps	Posttest	Follow-up
Metacognitive beliefs	Experimental	Pretest	-3.16	-2.90
		Posttest	-	0.26
	Control	Pretest	-0.06	-0.08
		Posttest	-	-0.11
Pain perception	Experimental	Pretest	-13.50*	-13.06*
		Posttest	-	0.43
	Control	Pretest	-0.06	-0.08
		Posttest	-	-0.11

The results of this study showed that emotion regulation training affects metacognitive beliefs in patients with functional indigestion. This result was in line with the findings of Ottonello, Fiabane, Pistarini, Spigno, and Torselli (2019).

In explaining this finding, it can be said that cognitive dominance of self-reinforcing interpretation patterns and the use of non-structural and threatening cognitive assessments by strengthening intrapersonal coping strategies in the face of stressful situations increase positive emotional outputs and reduce the level of negative emotional experiences (Cohen & Ochsner, 2018). In addition, the results of previous studies show that in the face of negative experiences, commitment to using self-reflective interpretations through inhibition of negative emotions prevents people from plunging into the abyss of impulse deficiency. Emotion regulation training can increase the ability of patients with functional indigestion to accept difficult living conditions and help to reduce self-blame and blaming others (Linhartova et al., 2019). Negative emotions and disability of patients were one of the key factors of inadequate attention and reduction of cognitive assessment; through emotion regulation skills training, they were able to control these inappropriate emotions and replace negative emotions with positive emotions. Training emotion regulation skills by informing people of their positive and negative emotions, and teaching them how to accept them and cope with them effectively can promote metacognitive beliefs in patients with functional indigestion.

Moreover, the results showed that emotion regulation training has an effect on pain perception in patients with functional indigestion. This result was in line with the findings of Koechlin, Coakley, Schechter, Werner, and Kossowsky (2018).

In explaining this finding, it can be said that patients with functional indigestion experience high levels of anxiety and psychological stress. Such patients require psychological interventions, including encouragement to express emotions. Approaches in emotion regulation interventions, due to causing mental experiences of positive emotions in patients with functional indigestion and providing solutions to cope with negative emotions and problems, increase life expectancy, and subsequently, improve pain perception. Coping with negative emotions may also serve numerous functions such as maintaining self-confidence, providing a sense of meaning and purpose, psychological relaxation, and a sense of hope (Cohen & Ochsner, 2018). Emotion plays an important role in different aspects of life such as adaptation to life changes and stressful events. Emotions can be considered as biological reactions to situations that we consider as important or challenging opportunities, and these biological reactions are accompanied by the responses we give to those environmental events; thus, it is natural that emotion regulation interventions improve pain perception, and subsequently, increase the mental health of patients with functional indigestion, resulting in less discomfort and stress and a better experience (Gross, 2001). Emotion regulation interventions as an adaptive coping strategy have a positive relationship with mental well-being and physical health and have a negative relationship with emotional disorders such as depression. In other words, regarding stressful issues such as death, accepting the problem and thinking about how to overcome the stressful event are associated with a reduction in anxiety caused by the stressful event. Thus, regarding the negative event as unimportance, emphasizing the relativity of the event compared to other events and accepting the situation, and coping with an unpleasant problem are related to better performance and reduction in symptoms of mental disorders.

Regarding research limitations, the results were restricted to patients with

functional indigestion, and the controlled and experimental literature review related to emotion regulation training was limited. This study was performed only on the population of patients with functional indigestion in Tehran, and caution should be exercised in generalizing the results to other regions and cities. It is suggested that this research be performed in another sample group, and its results be evaluated and compared with those of this research. Furthermore, it is suggested that the emotion regulation training introduced in the present study be compared with other psychological interventions. Finally, the researchers in future research should consider the present study results as new research hypotheses. If this research is conducted in other cities, and the results are evaluated, it is suggested that the participants be followed up after group training in the form of individual counseling.

Conclusion

It can be concluded that emotion regulation training was effective on metacognitive beliefs and pain perception in patients with functional indigestion.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The authors wish to thank all the individuals who participated in this study.

References

- Aziz, I., Palsson, O. S., Tornblom, H., Sperber, A. D., Whitehead, W. E., & Simren, M. (2018). Epidemiology, clinical characteristics, and associations for symptom-based Rome IV functional dyspepsia in adults in the USA, Canada, and the UK: A cross-sectional population-based study. *Lancet Gastroenterol Hepatol.*, 3(4), 252-262. doi:S2468-1253(18)30003-7 [pii];10.1016/S2468-1253(18)30003-7 [doi]. Retrieved from PM:29396034
- Casale, S., Rugai, L., & Fioravanti, G. (2018). Exploring the role of positive metacognitions in explaining the association between the fear of missing out and social media addiction. *Addict Behav.*, 85, 83-87. doi:S0306-4603(18)30325-3 [pii];10.1016/j.addbeh.2018.05.020 [doi]. Retrieved from PM:29864680
- Caselli, G., Fernie, B., Canfora, F., Mascolo, C., Ferrari, A., Antonioni, M. et al. (2018). The Metacognitions about Gambling Questionnaire: Development and psychometric properties. *Psychiatry.Res.*, 261, 367-374. doi:S0165-1781(17)31294-5 [pii];10.1016/j.psychres.2018.01.018 [doi]. Retrieved from PM:29353763
- Cohen, N., & Ochsner, K. N. (2018). From surviving to thriving in the face of threats: The emerging science of emotion regulation training. *Curr Opin.Behav Sci.*, 24, 143-155. doi:10.1016/j.cobeha.2018.08.007 [doi]. Retrieved from PM:31187051
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34(10), 906-911.
- Ford, A. C., Moayyedi, P., Black, C. J., Yuan, Y., Veetil, S. K., Mahadeva, S. et al. (2021). Systematic review and network meta-analysis: efficacy of drugs for functional dyspepsia. *Aliment.Pharmacol.Ther.*, 53(1), 8-21. doi:10.1111/apt.16072 [doi]. Retrieved from PM:32936964
- Gilbert, W., & Rushton, J. (2018). incentive perception in livestock disease control. *J. Agric. Econ.*, 69(1), 243-261. doi:https://doi.org/10.1111/1477-9552.12168.
- Gratz, K. L., & Gunderson, J. G. (2006). Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behav Ther.*, 37(1), 25-35. doi:S0005-7894(06)00005-0 [pii];10.1016/j.beth.2005.03.002 [doi]. Retrieved from PM:16942958

- Greimel, E., Feldmann, L., Piechaczek, C., Oort, F., Bartling, J., Schulte-Ruther, M. et al. (2020). Study protocol for a randomised-controlled study on emotion regulation training for adolescents with major depression: The KONNI study. *BMJ Open*, *10*(9), e036093. doi:bmjopen-2019-036093 [pii];10.1136/bmjopen-2019-036093 [doi]. Retrieved from PM:32912977
- Gross, J. J. (2001). Emotion regulation in adulthood: timing is everything. *Curr Dir Psychol Sci*, *10*(6), 214-219.
- Khosravi, M., Sadighi, S., Moradi, S. H., Zendehtdel, K. (2013). Persian-McGill pain questionnaire translation, adaptation and reliability in cancer patients: A brief report. *Tehran Univ Med J*, *71*(1), 53-58.
- Koehlin, H., Coakley, R., Schechter, N., Werner, C., & Kossowsky, J. (2018). The role of emotion regulation in chronic pain: A systematic literature review. *J Psychosom.Res*, *107*, 38-45. doi:S0022-3999(17)30961-3 [pii];10.1016/j.jpsychores.2018.02.002 [doi]. Retrieved from PM:29502762
- Linhartova, P., Latalova, A., Kosa, B., Kasperek, T., Schmahl, C., & Paret, C. (2019). fMRI neurofeedback in emotion regulation: A literature review. *Neuroimage*, *193*, 75-92. doi:S1053-8119(19)30178-8 [pii];10.1016/j.neuroimage.2019.03.011 [doi]. Retrieved from PM:30862532
- Mahmoudi, F., Maddahi, M., Poursharifi, H., & Meschi, F. (2019). Comparison of the effectiveness of acceptance and commitment group therapy and cognitive-behavioral group therapy on quality of life, anxiety and depression in patients with functional indigestion. *J Health Promot Manag*, *8*(4), 43-52.
- Melzack, R. (1987). The short-form McGill Pain Questionnaire. *Pain*, *30*(2), 191-197. doi:00006396-198708000-00005 [pii];10.1016/0304-3959(87)91074-8 [doi]. Retrieved from PM:3670870
- Mennin, D. S., Fresco, D. M., O'Toole, M. S., & Heimberg, R. G. (2018). A randomized controlled trial of emotion regulation therapy for generalized anxiety disorder with and without co-occurring depression. *J Consult.Clin.Psychol.*, *86*(3), 268-281. doi:2018-08989-005 [pii];10.1037/ccp0000289 [doi]. Retrieved from PM:29504794
- Otonello, M., Fiabane, E., Pistarini, C., Spigno, P., & Torselli, E. (2019). Difficulties in emotion regulation during rehabilitation for alcohol addiction: Correlations with metacognitive beliefs about alcohol use and relapse risk. *Neuropsychiatr.Dis Treat.*, *15*, 2917-2925. doi:10.2147/NDT.S214268 [doi];214268 [pii]. Retrieved from PM:31686826
- Pesce, M., Cargioli, M., Cassarano, S., Polese, B., De, C. B., Aurino, L. et al. (2020). Diet and functional dyspepsia: Clinical correlates and therapeutic perspectives. *World.J Gastroenterol*, *26*(5), 456-465. doi:10.3748/wjg.v26.i5.456 [doi]. Retrieved from PM:32089623
- Pindado-Ortega, C., Saceda-Corralo, D., Miguel-Gomez, L., Buendia-Castano, D., Fernandez-Gonzalez, P., Moreno-Arrones, O. M. et al. (2018). Impact of Folliculitis Decalvans on Quality of Life and Subjective Perception of Disease. *Skin.Appendage.Disord*, *4*(1), 34-36. doi:10.1159/000478053 [doi];sad-0004-0034 [pii]. Retrieved from PM:29457012
- Sadeh Tabariyan, M., Ghyasvandian, S., & Haghani, S. (2019). The effect of education based on Leventhals model on perception of disease in diabetic patients. *I3*(6 #100845), 76-82.
- Shirinzadeh Dastgiri, S., Goudarzi, M. A., Rahimi, C. H. A. N., & Naziri, G. H. (2009). Study of factor structure, validity and reliability of Metacognition Questionnaire-30. *Journal of Psychology*, *12*(1), 445-461.
- Unal-Aydin, P., Obuca, F., Aydin, O., & Spada, M. M. (2021). The role of metacognitions and emotion recognition in problematic SNS use among adolescents. *J Affect.Disord*, *282*, 1-8. doi:S0165-0327(20)33193-1 [pii];10.1016/j.jad.2020.12.103 [doi]. Retrieved from PM:33387741
- Wells, A., & Cartwright-Hatton, S. (2004). A short form of the metacognitions questionnaire: properties of the MCQ-30. *Behav Res Ther*, *42*(4), 385-396. doi:10.1016/S0005-7967(03)00147-5 [doi];S0005796703001475 [pii]. Retrieved from PM:14998733