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Self-perceived Quality of Life and response on warm water among women with Fibromyalgia

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Abstrakt

Målsetning: Målet med dette studiet var å avdekke kvinners selvoppfattelse av behandling i varmt vann og hvordan det påvirker livskvaliteten deres når de lider av fibromyalgi.

Metode: Det ble søkt etter artikler som tok for seg behandling i varmt vann, på MedLine. Utvalgte søkeord ga 26 artikler som tok for seg behandling av kvinner med diagnosen fibromyalgi ved hjelp av varmt vann, samt ser på livskvalitet. Seleksjon ble gjort for å finne de artiklene som på best mulig måte svarer problemstillingen. Ti artikler ble inkludert.

Resultat: Fem hovedkategorier tar for seg ulike symptomer ved fibromyalgi. Angst og depresjon, smerte, velvære, kroppsfunksjon og arbeidsevne. Etter å ha sammenliknet alle ti artiklene for hver av de fem kategoriene, ble signifikante forbedringer funnet i alle kategorier når man så på før- og etter behandlingsmålingene. Forbedringene ble sett både innad og mellom trenings- og kontroll gruppene. Når man la til en oppfølgingsperiode snudde tendensen. Forbedringene forsvant og noen artikler dokumenterte signifikant nedgang fra etter behandling til etter oppfølgingsperioden.

Konklusjon: Kvinner med fibromyalgi responderer bra på behandling i varmt vann. Selvfølelsen øker etter behandlingsperioden og smertefølelsen reduseres. Videre bør perioden etter behandling undersøkes.

Nøkkelord: Fibromyalgi, selvoppfatning, Livskvalitet, Spørreskjema, Varmt vann

Abstract

Objective: The aim of this study was to uncover women's self-perception of treatment in warm water and how it affects quality of life when diagnosed with fibromyalgia (FM).

Methods: Searching for articles dealing with warm water treatment on MedLine were done. Selected searching words gave 26 articles dealing with warm water treatment of women with FM and quality of life. Selection was made to find the articles best suited to the main issue. Ten articles were included in study.

Results: Five main categories deal with different symptoms of FM. Anxiety and depression, pain, wellness, body function and work ability. After comparing all ten articles on all five categories, significant improvements were found in all categories when looking at pre- to post-treatment. The improvements were seen within and between exercise- and control group. When adding a follow-up period, the tendency turned. The improvements disappeared and some articles documented significant decrease from post-treatment to follow-up.

Conclusion: Women with FM responds well on treatment in warm water. The self-esteem improves after treatment period and the pain experience decreases. Furthermore, the period after treatment should be examined.

Keywords: Fibromyalgia, Self-perception, Quality of Life, Questionnaire, Warm water

Introduction

There are several diagnoses today that do not have any medication with proven effect. Nevertheless, other treatments might give positive results. Therefore, it is important to investigate all kinds of treatment that seems plausible of curbing or remove the disease symptoms. Fibromyalgia (FM) is one such type of disease. (Clauw & Crofford, 2003) Medication has little or no effect on the FM symptoms. However, knowledge about the disease and physical activity have shown to give positive results. (Gowans, Dehueck, Voss, Silaj, & Abbey, 2004) FM is a chronic disease characterized by chronic widespread pain (CWP), which is increased sensitivity to pain in the skeletal muscles. (Clauw & Crofford, 2003), (Cuesta-Vargas & Adams, 2011) Palpation is used to examine tender points (TP), and if the patient experience pain in 11 out of 18 TP areas when it is palpated with 4 kg of pressure, it is considered as a TP according to the 1990 American College of Rheumatology (ACR) classification. (Wolfe et al., 1990) At least until 2010 when the criteria were revised. The cause of incorrectly examine of TP leaded to a new way to diagnose FM. The new method does not require physical or TP examination. Now the combination of widespread pain index (WPI) and symptom severity (SS) scale defines FM in this way: (WPI $\geq$ 7 AND SS $\geq$ 5) OR (WPI 3-6 AND SS $\geq$ 9). (Wolfe et al., 2010)

FM is a disease with some unknown factors about the exact cause. therefore, it is only assumed that the nervous system has changed in its way to process and send information about pain to the brain. One theory is that the chemicals in the nervous system comes in imbalance. Hormones as serotonin and noradrenaline are shown to be low in patients with FM. (Höcherl et al., 2000) Serotonin is involved in both depression and anxiety, and patients with FM often suffers from anxiety and depression. (Purves et al., 2012) Medication can alleviate these ailments to make everyday life better. However, these are side effects that can occur in FM patients.

Patients with FM experience different ailments, such as fatigue, sleep disturbance, stiffness and pain in muscles, headache, irritable bowel, anxiety, depression, memory and concentration issues. (Cuesta-Vargas & Adams, 2011) This contributes to influencing patients self-perceived quality of life and interfere with their daily living. This is factors that can be measured by questionnaires as the Fibromyalgia Impact Questionnaire (FIQ), The MOS 36-Item Short-Form health Survey (SF-36) and Psychological General Well-Being index (PGWB). (Burckhardt et al., 1991), (Ware & Sherbourne, 1992), (Grossi et al., 2006) Also, EuroQol group's EQ-5D instrument to show anxiety and pain levels, State-Trait Anxiety Inventory (STAI) to reveal anxiety and Visual Analog Scale (VAS) to reveal pain. (Shaw, Johnson, & Coons, 2005), (Marteau & Bekker, 1992), (Price, McGrath, Rafii, & Buckingham, 1983)

FM is most common among women and being 10 times as likely as men to experience the criteria for FM. (Clauw & Crofford, 2003) However, another study claims that women are six times more likely to be affected by FM. (Cuesta-Vargas & Adams, 2011) With higher age, the likelihood of having the disease increases. In addition, indications suggest that FM may be hereditary. Among families with a patient diagnosed with FM, the risk of other family members getting diagnosed is higher than in general population. (Clauw & Crofford, 2003)

One study refers to a study, written in a foreign language, that FM is a complex disease containing three main subdivisions. Muscle aspect as in fatigue and stiffness in skeletal muscles, pain aspect as in neuro and muscle system working together and psychological factors as well-being and mental health. These three subdivisions must be considered when dealing with studies about FM. (Letieri et al., 2013) Since the cause of FM is so complex and unknown, the treatment is still vague. Nevertheless, studies have tested various treatments over the past three decades with various result. To uncover the question of how the subdivision of neurons affects FM, studies have tested various deposits of hormones that have been shown to be low in FM and which separately have effect on some of the symptoms given when suffering from FM. (Höcherl et al., 2000), (Purves et al., 2012) Hormone medication has been an important factor in how FM can be cured. Today, there is no medicine that fully cure FM, just to curb the symptoms temporarily. (Höcherl et al., 2000)

Studies using physical activity as a possible damper on, or full recovery from the FM symptoms is widely used. There are many types of physical activities, but since patients with FM have pain in their muscle the activity has to be adjusted to something they can manage to do. Various strength exercises covering the big muscle groups as thigh, back and abdomen. Other activities which is gentle to the body is waist high water exercise. The water gives resistance due to higher density than air, and gentleness as every movement is slower. The third subdivision deals with the psychological aspect. To cover this section, the patient's self-esteem must be taken into consideration. Knowledge about mental health has evolved the past decades, and the methods to uncover this has improved. There have been studies testing how physical activity influences the FM symptoms and self-perceived quality of life. In addition, it has been tested how patient's knowledge about the FM disease have affect symptoms and self-perceived quality of life. (Clauw & Crofford, 2003), (Cuesta-Vargas & Adams, 2011)

According to today's recommendations on health sites online, who inform that FM is a diagnose with several symptoms, one must try different treatment. Briefly, a combination of change in lifestyle and medication are used. The importance of healthy eating, being physically active and sleep well is mentioned as essential to living with FM. In addition, medication that initially only relieve pain and/or improves quality of sleep as painkiller, antidepressant, sleeping pill, antipsychotics and anticonvulsants.

The focus among health sites, when it comes to treatment is warm water exercise, tailored exercise program and cognitive behavioral therapy. Also, psychotherapy, relaxation techniques and psychological support/support group are mentioned as possible methods. There is a great agreement that talking about the disease with someone who understands your struggle gives a positive effect. In addition, knowledge about the diagnose and what causes it to be worse has an impact on how to cope with the FM. Be told that the pain is not devastating processes in the body will ease on the concerns and decreases the experience of pain. ("Treatment," 2017)

With no clear answers on how to cure FM, but many options on how to relieve it, how should diagnosed patients deal with the sickness? Physical activity is highly recommended to make everyday life better with FM, and warm water exercise is highlighted as a form of treatment. The kind of exercise, and how long or often the exercise should be, is not unambiguously determine. Since there is no proper cure against FM and all advice available is to learn to live with the disease. How does water-based exercise among adult women diagnosed with FM affect their self-perceived quality of life?

Method

The literature search database of MedLine were used to find articles included in this study. Searching words used were fibromyalgia, water OR pool OR swimming pools, "quality of life", "surveys and questionnaires", self-concept, pain OR pain measurement. AND was put between these six searching words/themes and the outcome were 49 articles, as seen in figure 1. The search results were limited to only women and age 45-64 years. 35 articles remained. After adding the searching word AND "exercise", 26 articles remained. The abstract of all these were read. This led to an exclusion of two articles for being written in Spanish and Portuguese, 14 articles for not satisfying the main issue of this study. 10 articles were included in the result, as can be seen in table 1.
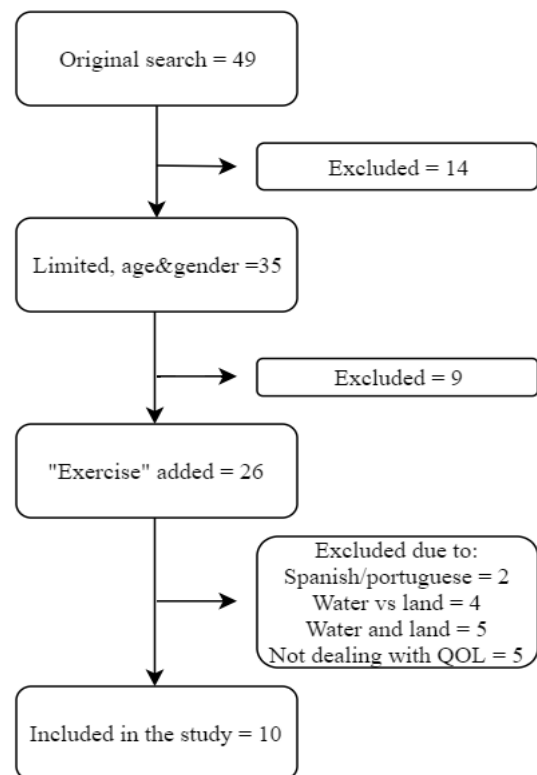

Figure 1: Selection process of articles included in study

Supporting literature about hormones were found by searching in MedLine. Searching words used were fibromyalgia, hormones, serotonin and

noradrenaline. AND was put between all four words. Two articles were found which of was one review and one article. The review was rejected after reading the abstract. Additional supporting articles were found by reading the included articles. References provided there were found in Google Scholar by searching the articles name.

One book was used for information. Anxiety were the searching word in the index at the end of the book. All pages included the word anxiety were read to find information.

Results

Those ten articles included in the study has a total of 659 different participants, where 15 of them are men, included in their results. Gusi, Tomas-Carus, A. Häkkinen, K. Häkkinen, & Ortega-Alonso (2006) and Tomas-Carus et al. (2007) use the same participants but with different purpose on the outcome. Five articles use exercise group (EG) and control group (CG) and compare them up against each other. Two articles have one EG and compares pre- and post-treatment within the group. Two articles deal with former participants from EG and giving them questionnaires. One article compares two different types of water-based activity. See table 1.

Table 1: Descriptive data from the included articles.

Author – Year	Included patients (is men)	Groups (n)	Age (years) (average ± Standard deviation)	Training duration	Sessions	
Cedraschi et al. – 2004	164 (12)	Exercise (84) Control (80)	? EG (48.9 ± 9.7) CG (49.8 ± 9.8)	12 sessions Twice a week 6 weeks 90 minutes (2x45minutes)	Pool-sessions (8x45mins) Relaxation (4x45mins) Land sessions (2x45mins) Daily living (2x90mins) Education (6x45mins)	
Tomas-Carus et al. – 2007	34 (0)	Exercise (17) Control (17)	35-73 EG (51 ± 10) CG (51 ± 9)	36 sessions 3 times a week 12 weeks 60 minutes	10 mins warm-up 10 mins aerobic exercise 20 mins overall mobility and lower-limb strength 10 mins aerobic exercise 10 mins cooling down	
Tomas-Carus et al. – 2008	30 (0)	Exercise (15) Control (15)	37-71 EG (50.7 ± 10.6) CG (50.9 ± 6.7)	X sessions 3 times a week 8 months 60 minutes	10 mins warm-up 10 mins aerobic exercise 20 mins overall mobility and lower-limb strength 10 mins aerobic exercise 10 mins cooling down	
Letieri et al. – 2013	64 (0)	Exercise (33) Control (31)	? EG (58.2 ± 10.6) CG (59.6 ± 9.4)	30 sessions Twice a week 15 weeks 45 minutes	5 mins warm-up 35 mins of aquatic exercise 5 mins of stretching	
Gusi et al. – 2006	34 (0)	Exercise (17) Control (17)	35-73 EG (51 ± 10) CG (51 ± 9)	36 sessions 3 times a week 12 weeks 60 minutes	10 mins warm-up 10 mins aerobic exercise 20 mins overall mobility and lower-limb strength 10 mins aerobic exercise 10 mins cooling down	
Altan et al. – 2003	46 (0)	Group 1 (24) Group 2 (22)	31-56 Group 1 (43.14 ± 6.39) Group 2 (43.91 ± 6.26)	36 sessions 3 times a week 12 weeks 35 minutes	Gr. 1 Warm-up Activity Relaxation Land-based	Gr. 2 Balneotherapy
Havermark and Langius-Eklof – 2006	240 (3)	Follow-up of treatment group (240)	25-79 (51 ± 10)			
Mannerkorpi et al. – 2002	28 (0)	Follow-up of treatment group (28)	? (45 ± 8.0)			
Segura-Jiménez et al. – 2012	33 (0)	Exercise (33)	? EG (50.0 ± 7.3)	24 sessions Twice a week 12 weeks 45 minutes	10 mins warm-up 25 mins of aquatic exercise 10 mins of stretching	
Pérez de la Cruz and Lambeck – 2018	20 (0)	Ai Chi (20)	53-70 (61.45 ± 4.62)	20 sessions Twice a week 10 weeks 45 minutes	Ai Chi	

To check if water-based activity influences FM, the results are divided into five categories were self-perceived feelings are measured using different questionnaires and methods. The five categories are anxiety and depression, pain, wellness, body function and work function. Each category has been checked by various studies with multiple questionnaires and methods. Further, the questionnaires and methods used in a category are divided into several subcategories suited to the main category.

Anxiety and depression are measured by seven out of ten articles. There are 5 different methods on how data is collected. FIQ, PGWB and EQ-5D deals with both anxiety and depression as subcategories, while Beck depression inventory only includes depression and STAI only measures anxiety. When looking at difference within groups before treatment period (pre-treatment) and after the treatment period (post-treatment) results show variations, and no logical connection can be found.

Table 2: Significant difference found within and between groups of anxiety and depression among the included articles.

Test	Article	Significant difference within a group (pre- and post-treatment)	Significant difference between groups found
Beck depression inventory	Altan et al 2003	No data	Yes: For baseline to week 12 (P<0.01) For Baseline to week 24 (P<0.05)
	Letieri et al 2013	Yes: In EG	Yes: P<0.05
FIQ – Anxiety and depression	Cedraschi et al 2004	Yes: Anxiety, EG (P<0.01) No: Anxiety and depression CG Depression EG	Yes: Depression (P<0.05) No: Anxiety
	Tomas-Carus et al 2008	No data	Yes: Anxiety (P<0.05) Depression (P<0.05)
	Havermark and Langius-Eklof 2006	No: Anxiety Depression	No data
	Mannerkorpi et al 2002	Yes: Anxiety (pre to post and to 12 months follow-up, P<0.05) Depression (pre to 12 months follow-up, P<0.05) No: Anxiety (pre to 30 months follow-up) Depression (pre to post and to 30 months follow-up)	No data
PGWB – Anxiety and depression	Cedraschi et al 2004	Yes: Anxiety, EG (P<0.05) No: Anxiety and depression CG Depression EG	Yes: Anxiety (P<0.05) No: Depression
EQ-5D	Gusi et al 2006	No data	Yes: Anxiety/depression (Baseline to 12- and 24 weeks, P<0.05)
STAI	Tomas-Carus et al 2008	No data	Yes: Anxiety (P<0.05)

However, EG tend to significantly improve their self-perceived anxiety and depression while CG always reports a nonsignificant change, see table 2. When including a follow-up period, the scores tend to go back to start. Results comparing the two groups reveals that anxiety and depression significantly improves when exercise, except of anxiety in FIQ and depression in PGWB measured in the study by Cedraschi et al. (2004) (Table 2)

Pain is measured by all ten articles using four different types of measuring methods. FIQ, SF-36, VAS and EQ-5D, all with the subcategory of pain. Difference within the groups reveal that exercising has a significant improve on pain pre- to post-treatment and all the CGs had no significant change, except in the study by Cedraschi et al. (2004) where CG got significantly more pain, and EG had no significant change. Segura-Jiménez et al. (2013) measured immediately changes. Result shows significantly

improve after every session except the first and fourth session. Pain measurement between the groups states that there is a significant difference in favor of EG, see table 3. Nevertheless, Altan, Bingöl, Aykaç, Koç, & Yurtkuran (2004) found no difference between the two groups in their study. As well as for Gusi et al. (2006) when looking at pre-treatment to follow-up, table 3.

Wellness is measured by six out of ten articles and using three different measuring techniques. FIQ, SF-36 and PGWB. Subcategories can be seen in table 4. Hävermark & Langius-Eklöf (2006) found significantly improve on FIQ-feel bad for both pre- to post-treatment and to follow-up. Furthermore, Mannerkorpi, Ahlmén, & Ekdahl, (2002) and Perez De La Cruz & Lambeck (2018) found significantly improve on SF-36- vitality (V) and social function (SF) pre- to post-

Table 3: Significant difference found within and between groups of pain among the included articles. *Significant worse.

Test	Article	Significant difference within groups (Pre- and post-treatment)	Significant difference between groups
FIQ – Pain	Cedraschi et al 2004	Yes: CG* P<0.05 No: EG	Yes P<0.05
	Tomas-Carus et al 2008	No data	Yes P<0.05
	Havermark and Langius-Eklof 2006	Yes: P<0.001 No: pre-treatment to follow-up	No data
	Mannerkorpi et al 2002	Yes: pre- to post-treatment and to 12 months follow-up (P<0.05), and to 30 months follow-up (P<0.01)	No data
SF-36 – Pain	Tomas-Carus et al 2007	No data	Yes Pre- to post-treatment and follow-up (P<0.05)
	Mannerkorpi et al 2002	Yes: pre- to post-treatment and to 30 months follow-up (P<0.05) No: Baseline to 12 months follow-up	No data
	Perez de la Cruz and Lambeck 2018	Yes P<0.01	No data
VAS	Altan et al 2003	Yes Both groups pre- to post-treatment and group 1 pre-treatment to follow-up (P<0.01) Group 2 pre-treatment to follow-up (P<0.05)	No Both groups
	Segura-Jimenez et al 2012	Yes Session 2,3,5-24 No Session 1 and 4	No data
	Letieri et al 2013	Yes: EG (P<0.05) No: CG	Yes P<0.05
	Perez de la Cruz and Lambeck 2018	Yes P<0.001	No data
EQ-5D	Gusi et al 2006	No data	Yes Pre- to post-treatment (P<0.05) No Pre-treatment to follow-up

Table 4: Significant difference found within and between groups of wellness among the included articles. *No data on RE and V

Test	Article	Significant difference within the group (pre- and post-treatment)	Significant difference between the groups
FIQ – Feel bad	Cedraschi et al 2004	No EG and CG	No
	Tomas-Carus et al 2008	No data	No
	Havermark and Langius-Eklof 2006	Yes Pre- and post-treatment (P<0.001) Pre-treatment and follow-up (P<0.05)	No data
	Mannerkorpi et al 2002	No	No data
SF-36 – Vitality (V), social function (SF) and role emotional (RE)	Cedraschi et al 2004	No EG and CG*	No *
	Tomas-Carus et al 2007	No data	Yes: Pre- to post-treatment, SF and RE (P<0.05) V (P<0.01) Pre-treatment to follow-up, RE (P<0.01) No: Pre-treatment to follow-up, V and SF
	Mannerkorpi et al 2002	Yes: SF- pre- to post-treatment and to 30 months follow-up (P<0.05), and to 12 months follow-up (P<0.01) V- pre- to post-treatment and to 12 months follow-up (P<0.01), and to 30 months follow-up (P<0.05) No: RE	No data
	Perez de la Cruz and Lambeck 2018	Yes: V (P<0.001) and SF (P<0.01) No: RE	No data
PQWB – Vitality, positive wellbeing (PW)	Cedraschi et al 2004	Yes: -V – EG, pre-treatment to follow-up (P<0.05) No: -V and PW - CG PW - EG	Yes: V (P<0.05) No: PW

treatment, and to follow-up, when exercise in water. Cedraschi et al. (2004) detected a significant improvement on PGWB- V, see table 4. Looking at the difference between groups reveals that Tomas-Carus et al. (2007) found a significant difference between pre- and post-treatment among social function (SF), role emotional (RE) and vitality (V). In addition, Cedraschi et al. (2004) found a difference for V. However, RE were the only subcategory that stayed improved from pre-treatment to follow-up. (Table 4)

Table 5: Significant difference found within and between groups of body function among the included articles.
*Significant worse

Test	Article	Significant difference within groups (pre- and post-treatment)	Significant difference between groups
FIQ – Physical function (PF), fatigue (F), morning tiredness (MT) and Stiffness (S)	Cedraschi et al 2004	Yes: F and MT - EG (P<0.01) No: PF and S - EG and CG F and MT-CG	Yes: F (P<0.01) No: PF, MT and S
	Tomas-Carus et al 2008	No data	Yes: PF and S (P<0.05) No: MT and F
	Havermark and Langius-Eklof 2006	Yes: F, MT and S - pre- to post-treatment (P<0.001) F and S- Post-treatment to follow-up (P<0.01) * MT- Post-treatment to follow-up (P<0.05) * No: PF	No data
	Mannerkorpi et al 2002	Yes: PF- pre- to post-treatment and 12 months (P<0.01) F- pre- to post-treatment (P<0.01) and to 12- and 30 months (P<0.05) S- pre- to post-treatment (P<0.01) and to 30 months (P<0.05) No: MT PF- Baseline to 30 months S- Baseline to 12 months	No data

Body function is measured by four out of ten articles using FIQ and the subcategories of physical function (PF), fatigue (F), morning tiredness (MT) and stiffness (S). EG tend to have significantly improvement in all articles when looking at difference between pre- and post-treatment, but there is no consistent result showing improvement other than F. Hävermark & Langius-Eklöf (2006) found a significant decrease in F, S and MT from post-treatment to follow-up. Also, looking at difference between groups does not state any difference. Cedraschi et al. (2004) found a significantly improve on F, while Tomas-Carus et al. (2008) found significant improvement on PF and S. Both in favor of EG (Table 5).

Work ability is also covered by four out of ten articles using FIQ. This time, the subcategories are work missed (WM) and job ability (JA). Mannerkorpi et al. (2002) found significantly improvement from pre-treatment to 30 months of follow-up, and from post-treatment to both 12- and 30 months of follow-up. Beyond that, no other articles can determine those results, see table 6. Tomas-Carus et al. (2008) had not included these two subcategories in the study.

In total, water-based exercise tends to better participants self-perceived feeling on some of FM symptoms, especially pain. However, all number shows that from post-treatment to follow-up tests the resulting scores goes towards the starting point of pre-treatment.

Table 6: Significant difference found within and between groups of work ability among the included articles.

Test	Article	Significant difference within the groups (pre- and post-treatment)	Significant difference between the groups
FIQ – Work missed (WM) and job ability (JA)	Cedraschi et al 2004	No: WM and JA	No: WM and JA
	Tomas-Carus et al 2008	No data	No data
	Havermark and Langius-Eklof 2006	No: WM and JA	No data
	Mannerkorpi et al 2008	Yes: WM- pre-treatment to 30 months (P<0.05) and post-treatment to 12- and 30 months (P<0.05) No: WM- pre- to post-treatment JA	No data

Discussion

The main purpose of this study was to assess if water-based exercise among adult women diagnosed with FM affect their self-perceived quality of life. Results in this study shows that warm water exercise influences quality of life in a positive way. However, maintaining the good results where to be difficult. Therefore, the period after treatment is as important as researching as the treatment itself. What it means to have good quality of life is not easy to say. Nevertheless, in this study the five categories presented in the result are good standards on quality of life.

Anxiety and depression are common among patients with FM. All articles in this study dealing with anxiety and depression found a difference between EG and CG, except of Cedraschi et al. (2004) who had no difference for anxiety in FIQ and no difference for depression in PGWB. However, another study supports that exercise, or other forms of therapy, in warm water affects anxiety and depression. (Gowans, Dehueck, Voss, Silaj, & Abbey, 2004) When it comes to efficiency of different types of treatment in water, Altan et al. (2004) looked at difference between exercise and balneotherapy. EG had better result, and it lasted for a longer period. Letieri et al. (2013) observed a decrease in depression in favor of the EG. Also, Gowans et al. (2004) getting the same results in depression.

The results on pain are more unambiguous. It is easier to determine whether it is pain or not and an improvement can be recognizable. Articles included in this study shows that all types of water treatment alleviate the pain. Yet, Gusi et al. (2006) found that pain got back towards

the beginning point in the follow-up period. Also, Segura-Jiménez et al. (2013) saw an immediately reduce in pain after each session, but pain at the beginning of every session the pain was still the same as previous sessions. How long the reduced pain levels maintained in hours after each session were not measured. Segura-Jiménez et al. (2013) mentioned in their discussion that this should be researched. Altan et al. (2004) did not find any difference between the two groups in their study. This can probably be explained by the fact that both groups were threatened with a form of water therapy. The knowledge of FM until now indicates that warm water relieves the pain, even without any form of exercise in combination. (Clauw & Crofford, 2003)

Results from categories of wellness and body function suffers from coincidence and few results. There is no consistent improvement among all articles. Both categories are difficult to measure as they depend on different people's own perceptions. Several factors as the trainer, program, group dynamic and composition of group has an impact on the result. How important these factors are to quality of life is uncertain as factors as pain, anxiety and depression are more covered.

The last category, work ability, had no answers among the articles dealing with this issue. Even though, Mannerkorpi et al. (2002) found an improvement in WM for the follow-up period. An issue with this category is that the participants are often at high age. With a study including few participants, and with some of them are retired as well, the result will become nonsignificant. This might occur in some of these studies. In Tomas-Carus et al. (2007) and Tomas-Carus et al. (2008) it is pointed out that their own study is not representative enough, since the participants are too few, and the conclusion must be verified. This applies to Perez De La Cruz & Lambeck (2018), Mannerkorpi et al. (2002), Gusi et al. (2006) and Altan et al. (2004) as well. Tomas-Carus et al. (2008) chose to exclude WM and JA from their results on FIQ. There is not written anything about why this has been done. These two subcategories are a part of FIQ. The exclusion must be considered as acceptable because the results were irrelevant for the issue.

Self-perceived changes are basically difficult to uncover. Patients who assign for the study have an expectation in some way. In this case, an improvement in health status might be one. Many of the patients were assigned into an EG or a CG. This largely determines what expectations the patients make before starting, and the post-treatment test can be affected by this. A participant in EG might count on an improvement, while participants in the CG feels

the opposite. They expect on nothing and might answer the same as they should not feel any different. Just participating in a project with other will have a psychological effect. The feeling of doing something about it helps, as well as being with other people dealing with the same problems. When being with others, the thoughts of having pain or other negative feelings are set to side. (Cuesta-Vargas & Adams, 2011) Problem with self-perceived measuring is that participants are different, and everyone perceives different. On the other hand, a participant who reports improvement indicates that the individual feeling better. Using the same participants on pre- and post-treatment will give the same outcome. A difficult topic is the question of experienced improvement versus actually improvement. When it comes to self-perceived improvements, both experienced- and actually improvements will count as betterment. (Clauw & Crofford, 2003)

There are good indications on improvements pre- to post-treatment when exercise in waist high water, but when the follow-up period is added in, the self-perceived scores goes back towards the pre-treatment test results. It is demanding for the participants to maintain the training in everyday life without it being arranged. If the participants are equally active as during the treatment, and it is becoming a habit, then the self-perceived results might go back to where it was. To uncover this, more studies with longer follow-up periods should take place or studies giving former participants questionnaires and asking how the training status are. An ethical problem is that the CG need to be offered the same treatment after the study. For the sake of research, one should look at how the CG develops in the follow-up period. (Cuesta-Vargas & Adams, 2011)

As result has shown, water therapy has many benefits on FM symptoms. However, Saltskaar Jentoft, Grimstvedt Kvalvik, & Mengshoel (2001) compared land-based and water-based exercise and concluded that both gives a positive effect on FM symptoms and physical capacity. When to recommend one method over the other, all possible factors must be considered. To exercise in a pool is more expensive and consuming, as well as the availability is not necessarily good. (Clauw & Crofford, 2003) Warm water, without the exercise, has shown by Altan et al. (2004) and Perez De La Cruz & Lambeck (2018) to be soothing on FM symptoms. Therefore, a good option for those who struggle with exercise. In general, FM exercising programs should focus on land exercise to include as many as possible. Nevertheless, water-based exercise should be an option.

Gusi et al. (2006) and Tomas-Carus et al. (2007) using the same participants. This does not affect the ending result in this study. Gusi et al. (2006) looks more closely into the category of pain and anxiety using EQ-5D. Tomas-Carus et al. (2007) uses STAI for looking at anxiety and SF-36 when looking at pain. Both gets the same result for anxiety. However, in pain there are a slightly difference between data measured with SF-36 and EQ-5D. With the SF-36, Tomas-Carus et al. (2007) found a significant difference from pre- to post-treatment between EG and CG in favor of EG. This occurred to last during the follow-up period of 12 weeks. Gusi et al. (2006) also found significant difference between the groups with the EQ-5D. The difference where in favor of EG as well. Though, the difference did not last during the follow-up period of 12 weeks. The same participant got different score in the follow-up period. One of SF-36 and EQ-5D might be unqualified and should be studied moreover.

From 1990 to 2010, patient where diagnosed with FM when 11/18 TP occurred. (Cuesta-Vargas & Adams, 2011) After 2010, the diagnosis was changed due to missing patient. Many of the articles in this study deals with the old system, which means that the articles before and after 2010 not necessarily can be compared to each other. The fact that the criteria changed indicates that the original criteria were not good enough. Clauw & Crofford (2003) criticized the old system for being too selective capturing women and those with high apprehension. Also, FM is a CWP disorder and only 20% of patients which categories with CWP also categories with FM. The 80% other have no real diagnose because of those TP. (Clauw & Crofford, 2003) Thus, they mention that abandoning the criteria of having 11/18 TP will lead to a totally different disorder were more men is included and less apprehension among patients.

Symptoms around FM responsible of giving patient the diagnose is complex. Many of the factors connected with FM are related to stress and what stress does to the body. This has been researched several of times and even though the human body has evolved in history. The stress response which is triggered might not refer to a treat of survival, but the amount of trigger and the frequency will overcome the threshold of what is tolerated. (Clauw & Crofford, 2003) Most of FM symptoms were improved by exercising in warm water. The studies included here supports this. Tomas-Carus et al. (2007), Gusi et al. (2006) Tomas-Carus et al. (2008) and Cedraschi et al. (2004) uses exercise sessions that lasts for 60 minutes or more while Altan et al. (2004), Letieri et al. (2013), Perez De La Cruz & Lambeck (2018) and Segura-Jiménez et al. (2013) uses sessions lasting shorter than 60 minutes. The duration of the session

seems to have no impact on the improvement. In addition, the number of sessions during a week seems to be two-three. No studies have tested one session, or more than three sessions per week. One session a week reduces the likelihood of it to becoming a habit, which is important for maintaining the symptoms on a low level in everyday life. Too many sessions increase the risk of other injuries due to shorter recovery period.

Conclusion

Patients with FM responds well on exercising in warm water. In addition, patients have shown to relieve some of the FM symptoms, especially pain, just by being in warm water. The self-esteem improves after treatment period and the pain experience decreases. These experiences of improvements are not lasting if one does not maintain warm water therapy or physical activity in any form. Therefore, this is not a healing measure. Further research should look at the period after treatment. Maintenance of exercising seems to be the biggest issue and that's why it is important to find out what motivates patients with FM to exercise.

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