



Qualitative study

Experiences of hatha yogic exercises among patients with obstructive pulmonary diseases: A qualitative study



Marian E. Papp^{a,*}, Maria Henriques^c, Gabriele Biguet^b, Per E. Wändell^a,
Malin Nygren-Bonnier^{b,d}

^a Department of Neurobiology Care Sciences and Society, Division of Family Medicine and Primary Care, Karolinska Institutet, Stockholm, Sweden

^b Department of Neurobiology Care Sciences and Society, Division of Physiotherapy, Karolinska Institutet, Stockholm, Sweden

^c Haninge Rehab, Handens Vardcentral, Box 550, SE-136 45 Haninge, Sweden

^d Functional Area Occupational Therapy & Physiotherapy, Allied Health Professionals Function, Karolinska University Hospital, Stockholm, Sweden

ARTICLE INFO

Article history:

Received 12 May 2017

Received in revised form

22 October 2017

Accepted 6 November 2017

Keywords:

Breathing exercises

Mind-body therapies

Pulmonary disease

Chronic obstructive

Dyspnea

ABSTRACT

Background and aim: Obstructive pulmonary diseases can involve dyspnea and deconditioning. Hatha yogic exercises are a form of psychophysical attention-based activity. Research of experiences after participating in an adapted hatha yoga (YE) intervention remains limited. The aim of the present study was to explore the experiences of patients with obstructive pulmonary diseases (asthma and chronic obstructive pulmonary disease) in a 12-week hatha yoga intervention (YE).

Method: Fifteen patients (10 women and 5 men, median age = 61, range: 44–76 years) who had participated in YE were interviewed after the intervention. Interview data were analyzed using qualitative content analysis.

Results: Three main categories emerged: “To focus and be aware of oneself”, “To gain new knowledge through practice” and “To master one’s own situation”. The overall theme “From limitation to opportunity – to experience breathing as a tool in daily life” illustrates a learning process on different levels. The participants described improved physical symptoms and breathing techniques, greater energy/stamina and body awareness along with a new sense of control over their breathing in different situations.

Conclusions: Patients with obstructive pulmonary diseases may strengthen their self-awareness and improve control of symptoms and learning new ways of breathing after practicing YE, which may provide a tool to control disease symptoms in daily life.

Trial registration number NCT02233114.

© 2017 Elsevier Ltd. All rights reserved.

1. Introduction

Chronic Obstructive Pulmonary Disease (COPD) and has a prevalence of 9–10% (Halbert et al., 2006) while asthma has a prevalence of 1–18% worldwide (Bateman et al., 2008). Prevalence of COPD and asthma in all health care forms in Stockholm County (according to registered diagnoses in electronic patient records) is

estimated at 1.8% and 5.9%, respectively (Carlsson et al., 2013). Symptoms of COPD include breathlessness (dyspnea), excessive sputum production, coughing and exacerbations. COPD involves a persistent airflow limitation and it is a chronic inflammation in the lung tissue with structural changes (Vestbo et al., 2013). Asthma is a chronic inflammation with episodes of broncho-obstruction and symptoms include smooth muscle contractions of genetic or environmental cause.

For patients with COPD, treatment that decreases dyspnea and fatigue are both pharmacologic and non-pharmacologic (Vestbo et al., 2013). The pharmacologic treatments are more efficient for asthma patients and often reverse their obstructive symptoms. Patients with decreased lung function often have low physical capacity and physical function caused not only by the decreased lung function but also by inactivity due to fear of dyspnea. Pulmonary rehabilitation supplement pharmacologic treatment and aim to

Abbreviations: YE, yogic exercises based on hatha yoga; CTP, individualized program of strength and endurance training based on physiotherapy; FEV₁, forced expiratory volume in one second; FVC, forced vital capacity; COPD, Pulmonary disease, chronic obstructive.

* Corresponding author. Department of Neurobiology Care Sciences and Society, Division of family medicine and primary care, Karolinska Institutet, Alfred Nobels alle 23, SE-141 83 Stockholm, Sweden.

E-mail addresses: marian.papp@ki.se, marianpapp@yahoo.com (M.E. Papp).

optimize physical function, prevent muscle dysfunction, decrease symptoms and improve quality of life (Osadnik et al., 2015). Although there is a consensus that patients with obstructive pulmonary disease benefit from rehabilitation, relatively few patients attend to pulmonary hospital-based rehabilitation programs in Sweden (Wadell et al., 2013). A reason may involve practical barriers and worries of not being able to manage the exercises (Fischer et al., 2007). Physical hatha yogic exercises have been shown to increase physical function and quality of life (Fulambarker et al., 2012; Liu et al., 2014; Donesky-Cuenca et al., 2009; Ranjita et al., 2016) and may thus constitute an alternative form of physical training and rehabilitation for patients not preferring conventional treatments (e.g., using devices and gyms).

Yogic exercises based on Hatha yoga are the most used yoga-style in the West (Cramer et al., 2016). It aims to use body, breath and mind simultaneously. Body, breath and mind are the three main tools of yogic practice and differ from other conventional physical activity methods. Hatha yoga is a form of psychophysical activity (Raub, 2002) but also a more intensive and modern style of yoga as well as a type of moving meditation (Shelov et al., 2009; Lorenc et al., 2014). It is reported to be a contemplative practice and grounded with embodiment and movement and involves cultivating the interoceptive, proprioceptive and kinesthetic awareness (Schmalzl et al., 2014). Hatha yoga has been reported to improve breathing technique, chest expansion, lung function, body posture (Pomidori et al., 2009; Abel et al., 2013; Liu et al., 2014), health-related quality of life and to decrease respiratory complaints (Cramer et al., 2014; Santana et al., 2013; Fulambarker et al., 2012; Borge et al., 2014).

Yoga programs have been suggested as a useful complement to formal rehabilitation programs (Desveaux et al., 2015) and as a safe complementary alternative to other breathing exercises for asthma patients (Cramer et al., 2014). When assessing the effect of treatment measures, biomarkers of lung function and lung specific or generic health questionnaires are often used. However, it is difficult to cover all relevant aspects of the effects of a treatment with quantitative methods. Thus, it is of value to complement such evaluations with qualitative data. Qualitative research methods aim to explore beliefs, attitudes and experiences during and after an intervention. This is of particular importance since yoga is multifaceted and uses body, breath and mind simultaneously and involves the mindfulness (observation) part and thus differs from other conventional physical activity treatments. Previous studies on experiences of yoga report increased body awareness, less pain and increased health control (Cramer et al., 2013; Keosaian et al., 2016; McCall et al., 2015). However, studies exploring experiences of physical hatha yogic exercises (YE) in patients with obstructive pulmonary diseases are lacking.

The aim of the present study was to explore the experiences of patients with obstructive pulmonary diseases participating in a 12-week hatha yoga intervention (YE).

2. Method

2.1. Study-design

Inductive qualitative content analysis method analysing both manifest and latent content based on individual interviews with participants attending hatha yoga (YE) twice a week for 12 weeks (1 h Sessions) (Graneheim and Lundman, 2004).

2.2. Participants

The participants were recruited from a larger RCT study (Papp et al., 2016) including a hatha yogic and a conventional treatment

(individually adjusted strength and cardiovascular exercises). Participants enlisted in the RCT study were recruited from the Stockholm county area via medical doctors, nurses, physiotherapists, and via bulletin boards, social media and email-lists from academic primary care centres and personal invitation letters.

All participants that fulfilled the 12-week yoga intervention from the RCT trail, including six with COPD and seven with asthma and two participants with both COPD and asthma, were invited and agreed to participate in the interview study (10 women, 5 men, median age 61, range 44–76). Duration of disease was median 7 years (2–56). Adherence to yoga practice was median 20 (6–24) out of a total of 24 classes. The majority of the participants had no prior experience of yoga. Regarding medication, all participants used pulmonary inhaler treatments including corticosteroids, either short and/or long acting β_2 -adrenergic drugs. Some took statins, anticoagulants, blood pressure medication and anti-arrhythmic medication.

Inclusion criteria were; age 35–85 years with obstructive pulmonary disease as COPD with mild to severe obstructions with GOLD 1–3, $FEV_1/FVC < 0.70$ or diagnosed asthma with FEV_1 and $FEV_1\%$ of predicted respiratory function of; $30\% \leq FEV_1 \leq 90\%$, (FVC = forced vital capacity). The patients were diagnosed by a physician according to GOLD-criteria and spirometric values (according to electronic patient records).

Exclusion criteria included severe neurological, orthopedic or rheumatologic injuries or diseases; inability to walk less than 200 m; severe lung diseases and very poor lung function; decreased mobility and chronic diseases that can affect performance; surgery within 6 months; severe mental disease diagnosis (incl. medication affecting attention); heart infarction within the last 12 months and medication change during the last 6 weeks.

The study was approved by the Regional Ethical Review Board in Stockholm (Ref. No.: 2011/248–31/1). The eligible participants signed informed consent forms and were informed of participation being voluntary and that participation could be cancelled at any time, without specifying any reason.

2.3. Data collection

Individual face to face, semi-structured interviews were conducted (in Swedish) and took place at the hospital and lasted between 20 and 45 min.

The interviews took place within one week following the completion of the YE intervention.

The open-ended interview approach and the non-directive interview style were further described and a general outline of domains and open-ended questions addressed in all interviews were presented in Table 1.

A thematised qualitative interview guide (Table 1) was developed by the research group (two physiotherapists with experiences of patients with obstructive lung diseases and rehabilitation, MNB and MH, and one physiotherapist with experience of qualitative methods, GB, and the first author experienced in public health and yoga, MP) and consisted of open-ended and broad questions concerning the participants' experiences during and after the YE. Emphasis was put on following domains: expectations, challenges in everyday life regarding the experience about the YE, the most important thing experienced with YE and anything particular that one have noticed or learned from participating in YE (Table 1). To deepen the dialogue and to get a wide range of descriptions, verbal prompts and follow-up questions (probes) were used, as well as concluding remarks in the closing part of the interview. Two pilot interviews were conducted (not included in analysis) to test the interview guide, however, no changes were made.

Table 1

Interview guide with domains and open-ended questions used in the semi-structured interviews.

Expectations
Do you remember what it was that convinced you to start practicing YE? Did you have any expectations (goals) with YE?
Experience of learning YE
What have YE meant to you? What was the most important thing with YE?
Experiences of YE in the beginning and towards the end of the intervention. What have you learned?
Challenges
Was there anything in particular that was challenging? Can you describe a situation during YE when you were assisted or got no help at all?
How did you feel practicing YE in a group? Were there any challenges?
How did you experience the role of the teacher during the YE classes?
Advice
What advice would you like to give to someone else with obstructive pulmonary disorder who wants to start practicing YE?
What advice would you give a physiotherapist regarding this intervention?

Note: Examples for prompts and follow-up questions (probes) were: 'What about?', 'I don't quite understand that', 'Can you clarify for me?' or 'Can you give me an example?'.

The interviews were performed by a physiotherapist (MH) not involved in the RCT study or the yoga classes and with no knowledge about the structure of the yoga program. Moreover, the interviewer did not meet any of the participants before the interview. The interviews were audio recorded with a digital dictaphone and transcribed verbatim by MH and first author. Both were familiar with the transcription process. The interviews were numbered and the interview transcripts were anonymized.

2.4. Data analysis

The transcribed interviews were analyzed using inductive qualitative content analysis focusing on both latent and manifest content (Graneheim and Lundman, 2004). The following steps were used in the analysis in accordance with the description of Graneheim and Lundman (2004). The first step consisted of reading the interview transcripts to get a general idea of the content. Then meaning units were formed, i.e. parts of the original text that is closely associated with the research question were extracted and condensed. This was done independently by MH and the first author MP and then compared and discussed until reaching consensus about the meaning units. The analysis proceeded with abstracting the condensed meaning units and labeling these with a code, which represented a description close to the text. The text was then reread several times and compared to the codes so no information was lost from the body of text. The codes were sorted into groups representing a higher level of abstraction, and further divided into subcategories and categories while comparing similarities and differences in codes, and code groups. This process involved the close collaboration between MH and the first author. Both categories and sub-categories were considered expressions of the manifest content of the text and examined to be mutually exclusive. Finally, an overall theme was developed to link the underlying meaning between the emerging categories. The theme described the latent content of the text which has to be interpreted (Graneheim and Lundman, 2004).

During the analysis steps credibility of preliminary findings and the process of reflection were addressed in the whole research group by carefully following up on the whole analysis process. Divergent views concerning the categorization were discussed until consensus was reached (Elo and Kyngäs, 2008; Elo et al., 2014). Quotations chosen from all interviews to illustrate the present findings were assigned with a number for each participant. Quotes have been translated from Swedish into English.

2.5. Yoga intervention

The yoga classes were held in the spring 2015 at the Karolinska University hospital with one yoga teacher and in a light and well-ventilated room without music. The program was developed by the first author, who is an experienced yoga teacher and certified yoga therapist.

The participants were sitting quietly on chairs with general yogic breathing instructions using the complete yogic breath technique. Standing (upright half-moon, triangle, side angle pose) sitting and twisting poses were used and breathing control and awareness was emphasized throughout the classes. Sitting and supine poses (cat and cow, bridge, universal pose) and classical breathing exercises (kapalabhati, bhastrika, nadi shodhana, bhramari) were taught. Props including blocks, chairs and blankets were used to increase safety and individual adaptation for each patient. The class included 35 min asanas, 20 min of breathing exercises with 5–10 min of relaxation. Home exercises were recommended and the participants received a 55-min DVD with the same program as at the face-to-face yoga sessions.

3. Results

The analysis resulted in an overall theme, three categories and seven sub-categories (Table 2).

3.1. From limitation to opportunity – to experience breathing as a tool in daily life

The overall theme reflects a learning process on different levels and revealed a shift in how the participants experienced their breathing. Having an obstructive lung disease was described as a limitation by the participants. Participating in YE gave them opportunity to focus and be aware of their body and breath and to learn new breathing exercises that could be used to control the breathing in daily life.

“... I got a much better understanding of the breathing that you can actually breathe in different ways not just in and out,... that you can actually control the breathing a lot and that has helped me a lot during physical activity . Interview No. 7.

Table 2
Overview of the findings.

Overall theme		
From limitation to opportunity—to experience breathing as a tool in daily life		
Categories		
To focus and be aware of oneself	To gain new knowledge through practice	To master one's own situation
Subcategories		
Becoming more focused	Feeling safe and guided	Being able to control the breathing
Getting new insights about body and breath	Learning by doing	Being able to manage stress and achieve balance
		To have more stamina in order to master challenges

3.2. To focus and be aware of oneself

The participants described YE as a novel opportunity to focus and be aware of their own breathing and oneself. Both the focus on and awareness of the breathing were experienced in a new way and seen as an important part of practicing YE. Awareness and focus during the practising of YE seemed necessary for developing new insights into the different ways of breathing.

3.2.1. Becoming more focused

The importance of being fully focused during YE helped the participants to perform the exercises at their own pace and to synchronize the movements with the breathing. To focus was described as being present in the moment and concentrating on the body, the breathing and the exercises. This mindful self-focus on the breathing was described as a way of relaxing, with a joy of setting aside time for oneself and ones' needs. The participants pointed out the importance of being fully aware of the whole body during the YE.

"after a few times I was able to get into that mood very quickly, when you filter out all unnecessary things, you don't bring along any thoughts about different things ... instead I could easily focus on being there, in that moment and I thought that was a positive effect" Interview No. 14

"I get to relax, to shut everything out and to be selfish and only think of me ..." Interview No. 13

The participants were surprised of the effect of being together with others in a group and at the same time being able to focus strongly on themselves. To be fully absorbed and focused on the breathing, but also losing track of time was reported by the participants. They were amazed of not being disturbed by the others in the group during the YE, not even when they received individual guidance. The calm yoga teacher seemed to create a positive atmosphere, making it possible for the participants to continue focusing on their own practice. This created a positive experience of YE in a group situation.

3.2.2. Getting new insights about body and breath

New insights about discovering different ways of breathing resulted in participants reflecting over their breathing thus becoming more aware of their breathing patterns. For example they were surprised over the fact that single breathing exercises could have powerful effects. The participants also mentioned their thoughts about different bodily processes influencing each other. Other discoveries involved participants increasing their awareness of how different body positions can change the depth of breathing, how nasal breathing felt gentle for the breathing passages and regarding the importance of the exhalation but also that breathing was easier with relaxed muscles.

"... suddenly when you start breathing in one way you start freezing and in another way you start sweating and it is amazing what you can do to the body" Interview No. 5

"I think some exercises have been really good, that is you immediately feel that they open up the airways and that you get a lot of oxygen during these exercises and so that was a great surprise, that you get that feeling in just one exercise" Interview No. 3

The participants described how they became more aware of the short and shallow breathing they had before the intervention and mentioned that they consciously started to breathe more deeply and efficiently by using the diaphragm. They also experienced an increased awareness of symptoms such as nasal congestion and phlegm in the respiratory tract. This increased body-awareness and breath-awareness and respiratory symptoms were helpful in consultations regarding medication with their doctors. The YE home training created another possibility for reflection and increased awareness.

"At least I think that you get an ... in yoga they use to talk about body control or body awareness, but that you ... well I feel that in these exercises, I've been able to breathe through my nose (laughs) or how it feels in the chest and feel that, no now it is phlegm and perhaps I haven't felt it so early on before so it's body awareness or something" Interview No. 3

3.3. To gain new knowledge through practice

It was revealed that actively participating in YE involved conquering new knowledge about the body and one's breathing through the performance of the exercises, i.e. "learning by doing". Even individuals with some experience of YE mentioned that participating in YE deepened their knowledge about breathing techniques. Specifically, the YE were experienced as an opportunity for them to anchor their new knowledge through hands-on experience and practising.

3.3.1. Feeling safe and guided

The yoga teacher's guidance was perceived as important, not only due to participants getting feedback on correct techniques and body positions but also getting feedback on the power of practicing and how to adjust the poses to individual needs. The teacher feedback seemed important for feeling safe and secure and gave everyone the same attention.

"When you feel totally dizzy then (the instructor) says that you can feel very dizzy, like this and you do. So you don't think that you faint and that you have problems.So it has been really clear and all have felt safe ..." Interview No. 5

It was reported that group training was experienced as joyful with a positive atmosphere giving opportunities to share experiences and challenges.

"It gives a sense of belonging to a group. You get to know (each other) and you have similar preconditions to work with but then we have different bodies and I often find it easier to work in a group because you push each other more" Interview No. 1

3.3.2. Learning by doing

While doing the exercises the participants mentioned instantly feeling the effects of the different breathing techniques. The metronome was described as an efficient feedback instrument and helpful for observing the breathing and to feel the different qualities of the breathing as the length of the different breath-phases. This helped the participants to more strongly perceive the breathing and was reported to induce a deeper and calmer breath. Also, by using the diaphragmatic breathing, the patients perceived an improvement of the depth of breathing both during the classes and during the intervention period.

"it probably took like four five six times before you, because in the beginning then I think, when you haven't done this before, I haven't at least, and you rushed, you did things too quickly and when you do yoga, that I've understood, it has to be slow with slow movements" Interview No. 7

The regular practise of YE was perceived as an important factor for improvements to occur. In the beginning of the intervention difficulties to perform the exercises properly were described but also synchronizing the movements with the breath. Feelings of insecurity could also surface when not understanding clearly the aims of some of the breathing exercises. Home training exercises were difficult and depended on many factors including practical reasons and confusion about how to perform the movements. Some participants reported that they were unsure of whether to proceed with the intervention in the beginning but after a few weeks they decided to continue. The YE got more challenging throughout the intervention and this increased the participants' motivation and joy since they were able to manage the exercises.

"Yes, every time it improves ... Every time you get stronger, in the beginning you couldn't relax, in the beginning you get tense and don't want to relax but then, eventually you learn and feel that you can do it" Interview No. 12

3.4. To master one's own situation

Participating in YE created opportunities for the participants themselves to control symptoms of lung disease, not only during the exercises but also in daily life. The participants reported that they felt able to control their breathing and stress levels, thus achieving feelings of harmony and balance. They also experienced increased energy, improved stamina, coping ability and feelings of safety and security while participating in YE and other physical activities.

3.4.1. Being able to control the breathing

Voluntary breath-control, which was achieved through the different breathing techniques, was reported to minimize breathlessness, dyspnea, coughing and cramp in the respiratory tract.

Participants reported that they started to use many of the poses and breathing techniques in everyday life for example, diaphragmatic breathing, using active exhalations (using the abdominals) and different restorative resting positions. Other things the participants noticed were the increased efficiency and power of the breathing muscles and they learned how to prevent chest breathing. The increased control created feelings of safety and less panic during dyspnea.

"I have learnt that you should bend forwards if you get these breathing problems so I know that I can use that tool so to speak if I get this cramp" Interview No. 8

The participants experienced less phlegm, cough, allergic complaints and several reported that they reduced their asthma medications during the intervention. They also reported improved sleep quality.

I actually think that if I feel the asthma [coming], instead of taking a quick Ventolin (medication) it is possible to do a breathing exercise and having it work. It's not that I've stopped taking my meds [medication], rather I feel that perhaps I should but instead I do these breathing exercises and it [the asthma] improves." Interview No. 6

3.4.2. Being able to manage stress and achieve balance

The participants reported that performing YE reduced their stress and improved relaxation. Here, the instructor's calm state contributed to the relaxation. Some participants felt calm already before the yoga class but during the class they too reported developing a gradually deeper relaxation. After the classes feelings of well-being, balance and being satisfied with oneself was experienced. To be able to exercise, that had previously been associated with discouragement of symptom impairments, was described to create feelings of relief.

"I feel I learned these exercises well, I'll continue with these ... I achieved this control and harmony and balance thing, and now I have it. I understand how to master it ... I did, I didn't do that when I started. I will take this to my heart ..." Interview No. 14

The home training involved developing feelings of being able to reduce stress and was experienced as a form of self-control. Coping with stress and to be able to unwind and induce calmness was described as very important:

"it feels very good that you can lay down and it is like meditating, almost the same thing, you are totally calm and the whole body, I think you can use this all life so to speak so that you can relax during stressful situations and not get stressed but instead try to calm down" Interview No. 8

3.4.3. To have more stamina in order to master challenges

Increased stamina was experienced as a strong experience after YE, with participants perceiving that they were able to run faster and longer, to maintain walking speed with their spouses, something that had been impossible before, and to be able to cope with daily activities. In general participants reported mastering activities that they previously thought were impossible to deal with. They also reported experiencing a faster recovery after physical exertion. All these effects were considered by the participants to relate to a more efficient breathing technique.

"I have realized that I can cope with situations in a different way. I can do more now, can and have the strength to do more, I realize that I can walk longer without having to rest" Interview No. 13

More stamina was described as a tendency to get things done. It was described as a feeling of joy and euphoria that improved coping and stamina that could be self-controlled. Improved physical well-being, muscle strength, balance, coordination and flexibility were mentioned as perceived physical benefits after YE. Some also mentioned less pain and improved urinary bladder control.

"... and then I have realized that after, afterwards, you can get completely euphoric. I jump home and feel ready to do all those things that I felt ... oh ... how will I manage ... before stepping into the class" Interview No. 5

The obstacles and challenges with the YE were something that the participants seemed to conquer. Specifically, they reported that the YE was physically challenging, they (really) got the opportunity to stretch their bodies, becoming tired after exerting themselves both during and after class. A common observation was that individual adaptations to their own needs were necessary for some of the poses. Uneasiness including tiredness and pain usually decreased gradually during the intervention.

"I did not manage to lay down, the strength in the muscles did not last as long as it was supposed to ... Is it called the Tiger when you stand on all fours and stretch your legs and arms diagonally? I did not manage to do it all that long, my muscles ran out of power" Interview No. 13

"sometimes I was really tired. Even though I thought the exercises were quite simple and not so exhausting one at a time, but I was still quite drained afterwards" Interview No. 3

4. Discussion

This is one of the first qualitative studies exploring experience of patients with obstructive respiratory diseases participating in a program with YE. The participants found that practising YE to be helpful in becoming more focused, which in turn created a calmer and deeper breathing. Participants also reported increased body awareness, energy, stamina and mastery of the disease in their everyday life. This is a valuable new finding.

Furthermore, improved awareness of breathing in combination with more efficient breathing techniques were experienced as an important learning opportunity as well as something that increased their perceived control over their health. The YE involved a learning process, reflected in the participants expressing how they learned to work at their own level with them feeling stronger throughout the intervention as well as feeling more relaxed as they could practise the poses better as the intervention proceeded. This becomes evident in the three categories in the present study (Table 2). Increased awareness seems to be the active ingredient of YE needed for improvements to occur (Keosaian et al., 2016; Cramer et al., 2013), especially as it pertains to patients with pain (Cramer et al., 2013) and obstructive pulmonary diseases (Santana et al., 2013). The attention part of yoga seems to be an important instrument for these patient groups. Improved body awareness, control over one's health and pain reduction are a few of the mechanisms emerging after continuous yogic practice, i.e. "learning by doing", and is something which has also been reported in other qualitative studies (Cramer et al., 2013; Keosaian et al., 2016; McCall

et al., 2015).

The main yogic tools and active ingredients of YE involve working simultaneously with body, breath and mind. These three tools work together to involve the individual fully and are using both a bottom-up (doing the exercise) and top-down (observing with the mind) perspective (Gard et al., 2014). This means that the individual is involved in the practise in a more focused way since the "listening" part is added (Raub, 2002; Selman et al., 2015; Gard et al., 2014). The reported experiences included being taught new ways of controlling and using their breathing as a way to counteract symptoms, such as dyspnea and coughing, related to obstructive pulmonary disease.

In general this means that the individual takes more responsibility of self-controlling the symptoms. In the present study this was reflected in the increased self-control experienced with the help of the three yogic tools. Increased self-control is an important outcome and goal of YE that has been reported by the participants in this study under the category "To master one's own situation".

Furthermore, the participants reported increased stamina and energy, which can be explained by the yoga style used and that the program included vigorous poses and breathing exercises. Improved energy and stamina has been previously reported in patients with lung disease (Liu et al., 2014; Cramer et al., 2014). Other studies have suggested that a better breathing technique may be a mechanism to more energy (Ray et al., 2011).

Published quantitative data (Papp et al., 2016) from the group investigated in the present study revealed improved functional capacity and is in line with the reported experiences in the present study of improved stamina and energy and is in line with other studies for patients with obstructive lung diseases (Liu et al., 2014; Cramer et al., 2014). The mechanism for increased functional capacity in our published quantitative study (Papp et al., 2016) with the same participants interviewed here may involve a more efficient breathing pattern and having more energy (Ray et al., 2011; Liu et al., 2014; Cramer et al., 2014).

Patients with obstructive diseases reduce their physical activity levels (already at GOLD II) and rehabilitation is an important factor to prevent deconditioning and disease progression (Troosters et al., 2010). Rehabilitation helping patients to self-manage their symptoms and improve quality of life needs to be emphasized for this patient group and that maintenance of health through physical activity is important (Gysels and Higginson, 2009) the style of yoga used in the present study is often named as a form of physical activity. Asthma symptoms, quality of life, exercise capacity and bronchial hyper reactivity have all been shown to improve in asthmatics after physical training (Eichenberger et al., 2013) and can be used as a tool to control the disease. A recent Cochrane review reports that yoga to some extent improves quality of life and asthma symptoms to some extent (Yang et al., 2016) and has been suggested to serve as an alternative rehabilitation choice for patients with obstructive lung diseases (Desveaux et al., 2015).

Using breathing exercises can improve breathing technique (Borge et al., 2014), which seems to be one of the important yogic tools to increase awareness that the patients experienced in the present study. This has been reported under the category "To master one's own situation" were the participants reported decreased use of bronchodilators and less breathlessness as well as an increased mastery of dyspnea following YE. Other yogic interventions using (Sendhilkumar et al., 2012) breathing exercises for 3 weeks - a total of 15 h - showed significant improvements in sleep patterns when compared to usual care. This suggests that short interventions can have powerful and non-pharmacological effects.

Santana (Santana et al., 2013) used a mixed design study and

report less fatigue, improved quality of life and breathing capacity with less anxiety and pain after yogic exercises. And the qualitative part of the study report quotes as: “increased tidal volume with slowing expiration” and “I have an overall feeling of well-being” and “excellent amount of energy” (Santana et al., 2013).

Several studies have shown that participants after yoga exercises reported improved quality of life (Fulambarker et al., 2012; Santana et al., 2013). This could be related to the experiences of improved mastery reported in the present study under the category, “To master one's own situation” and can perhaps improve quality of life in the long run, since the patients experienced that they were able to master their symptoms to a greater extent themselves. Self-efficacy is an important predictor described by others (Bandura, 2004) as a form of behavioural change.

Measuring mastery on the CRQ questionnaire (quantitative data) revealed that mastery increased significantly in our previously published RCT-trial (Papp et al., 2016) thus suggesting that objective and subjective data can mirror each other.

In the present study, participants reported difficulties and challenges in the beginning of the intervention related to the synchronization of breathing and movements, but after 5–6 times it was reported to be easier. Furthermore, insecurity appeared when the aim of some breathing exercises was not clearly understood. To improve program design, future interventions should introduce fewer exercises in the beginning. As for the home training program, difficulties were experienced due to participants being unsure of how to perform the movements. This suggests that future home training programs should be very clearly designed.

Social interaction before and after YE may have strengthened the experiences and effects of YE. However, during class, silence (no conversation) was encouraged. Being in a group setting with a common goal may have created a positive social atmosphere (Santana et al., 2013) and may have increased the participants personal empowerment (Mccall et al., 2015) as well as having added to their awareness of the self and the physical body. The importance of a positive atmosphere has been reported under the category, “To focus and be aware of oneself”.

5. Methodological considerations

The credibility of the data collection and the analysis process was assured by close cooperation within the research group and good competency levels pertaining to content analyses, yoga teaching and clinical experiences of working with obstructive pulmonary disease. Further, the interviews were performed by an independent interviewer not involved in the intervention and took place directly after the intervention while the participants had their experiences fresh in mind. Using open-ended questions during the interview encouraged the participant to express their experiences. The interview guide used two pilot interviews in order to strengthen the interview technique; they were not included in the analysis. The YE program is described in detail elsewhere (Papp et al., 2016).

An important strength of the present study was that all the participants engaged in the YE intervention accepted to be interviewed. This together with the variation of participants, regarding gender, age and different levels of obstructive lung diseases provided a broad purposive sampling and thus strengthens the transfer of the findings to a wider sample.

The limitations involve excluding GOLD grade IV COPD patients due to the characteristics of the YE. Thus transfer of our findings to patients with severe obstruction is not fully possible. Moreover, the recruitment process and the participants' preferences and expectations for treatment assignment and positive outcomes should be considered as a limitation. Since the interviews were performed

directly after the intervention the long-term experience of YE is unknown.

6. Clinical implications

- Patients with obstructive pulmonary disease can strengthen awareness and improve control of breathing through yogic exercise (YE) practice.
- Yogic exercises can help individuals to find new ways of breathing and to control dyspnea.
- Yogic exercises can provide a tool to control and master the obstructive pulmonary disease.
- The mechanism of change and the active tool in YE seems to involve the simultaneous awareness and focus of body, breath and mind and the consistent practice. The power of practice has to be highlighted for the patient group.

7. Conclusion

The experiences of people with obstructive pulmonary diseases who had used YE revealed the importance and power of practicing (learning by doing). This appeared as a central component for facilitating self-awareness and learning new ways of breathing. The control of symptoms and breathlessness through YE practice may serve as a tool for strengthening mastery of the disease. The possible contribution of YE in gaining competency to control symptoms related to asthma and COPD in everyday life is an important new finding.

Declarations of interest

We conformed to the Helsinki Declaration concerning human rights and informed consent, and followed correct procedures concerning treatment of humans. Marian Papp, Malin Nygren-Bonnier, Gabriele Biguet, Per Wändell and Maria Henriques declare that they have no conflict of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author contributions

MP and MH performed the literature search, MP and MNB designed the study, MP, MH and MNB performed the study with data collection. MP, MNB and MH, GB analyzed the data. MP wrote the manuscript assisted by MNB, PW and GB. All authors read and approved the final version of the manuscript.

Acknowledgements

Thanks to all patients who volunteered participation. Thanks to Professor Petra Lindfors for language editing and valuable feedback on the manuscript.

References

- Abel, A.N., Lloyd, L.K., Williams, J.S., 2013. The effects of regular yoga practice on pulmonary function in healthy individuals: a literature review. *J. Altern. complementary Med.* 19, 185–190.
- Bandura, A., 2004. Health promotion by social cognitive means. *Health Educ. Behav.* 31, 143–164.
- Bateman, E.D., Hurd, S.S., Barnes, P.J., Bousquet, J., Drazen, J.M., FitzGerald, M., Gibson, P., Ohta, K., O'Byrne, P., Pedersen, S.E., Pizzichini, E., Sullivan, S.D.,

- Wenzel, S.E., Zar, H.J., 2008. Global strategy for asthma management and prevention: GINA executive summary. *Eur. Respir. J.* 31 (1), 143–178.
- Borge, C.R., Hagen, K.B., Mengschoel, A.M., Omenaas, E., Moum, T., Wahl, A.K., 2014. Effects of controlled breathing exercises and respiratory muscle training in people with chronic obstructive pulmonary disease: results from evaluating the quality of evidence in systematic reviews. *BMC Pulm. Med.* 14, 184.
- Carlsson, A.C., Wandell, P., Osby, U., Zarrinkoub, R., Wettermark, B., Ljunggren, G., 2013. High prevalence of diagnosis of diabetes, depression, anxiety, hypertension, asthma and COPD in the total population of Stockholm, Sweden - a challenge for public health. *BMC Public Health* 13, 670.
- Cramer, H., Lauche, R., Haller, H., Langhorst, J., Dobos, G., Berger, B., 2013. "I'm more in balance": a qualitative study of yoga for patients with chronic neck pain. *J. Altern. complementary Med.* 19, 536–542.
- Cramer, H., Posadzki, P., Dobos, G., Langhorst, J., 2014 Jun. Yoga for asthma: a systematic review and meta-analysis. *Ann. allergy, asthma & Immunol. official Publ. Am. Coll. Allergy, Asthma, & Immunol.* 112 (6), 503–510.
- Cramer, H., Lauche, R., Langhorst, J., Dobos, G., 2016. Is one yoga style better than another? A systematic review of associations of yoga style and conclusions in randomized yoga trials. *Complementary Ther. Med.*
- Desveaux, L., Lee, A., Goldstein, R., Brooks, D., 2015. Yoga in the management of chronic disease: a systematic review and meta-analysis. *Med. Care* 53, 653–661.
- Donesky-Cuenca, D., Nguyen, H.Q., Paul, S., Carrieri-Kohlman, V., 2009. Yoga therapy decreases dyspnea-related distress and improves functional performance in people with chronic obstructive pulmonary disease: a pilot study. *J. Altern. complementary Med.* 15, 225–234.
- Eichenberger, P.A., Diener, S.N., Kofmehl, R., Spengler, C.M., 2013. Effects of exercise training on airway hyperreactivity in asthma: a systematic review and meta-analysis. *Sports Med.* 43, 1157–1170.
- Elo, S., Kyngäs, H., 2008. The qualitative content analysis process. *J. Adv. Nurs.* 62, 107–115.
- Elo, S., Kaariainen, M., Kanste, O., Polkki, T., Utriainen, K., Kyngäs, H., 2014. Qualitative content analysis: a focus on trustworthiness. *SAGE Open* 4.
- Fischer, M.J., Scharloo, M., Abbink, J.J., Thijs-Van, A., Rudolphus, A., Snoei, L., Weinman, J.A., Kaptein, A.A., 2007. Participation and drop-out in pulmonary rehabilitation: a qualitative analysis of the patient's perspective. *Clin. Rehabil.* 21, 212–221.
- Fulambarker, A., Farooki, B., Kheir, F., Copur, A.S., Srinivasan, L., Schultz, S., 2012. Effect of yoga in chronic obstructive pulmonary disease. *Am. J. Ther.* 19, 96–100.
- Gard, T., Noggle, J.J., Park, C.L., Vago, D.R., Wilson, A., 2014. Potential self-regulatory mechanisms of yoga for psychological health. *Front. Hum. Neurosci.* 8, 770.
- Graneheim, U.H., Lundman, B., 2004. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ. Today* 24, 105–112.
- Gysels, M.H., Higginson, I.J., 2009. Self-management for breathlessness in COPD: the role of pulmonary rehabilitation. *Chron. Respir. Dis.* 6, 133–140.
- Halbert, R.J., Natoli, J.L., Gano, A., Badamgarav, E., Buist, A.S., Mannino, D.M., 2006. Global burden of COPD: systematic review and meta-analysis. *Eur. Respir. J.* 28 (3), 523–532.
- Keosaian, J.E., Lemaster, C.M., Dresner, D., Godersky, M.E., Paris, R., Sherman, K.J., Saper, R.B., 2016. "We're all in this together": a qualitative study of predominantly low income minority participants in a yoga trial for chronic low back pain. *Complementary Ther. Med.* 24, 34–39.
- Liu, X.C., Pan, L., Hu, Q., Dong, W.P., Yan, J.H., Dong, L., 2014. Effects of yoga training in patients with chronic obstructive pulmonary disease: a systematic review and meta-analysis. *J. Thorac. Dis.* 6, 795–802.
- Lorenc, A.B., Wang, Y., Madge, S.L., Hu, X., Mian, A.M., Robinson, N., 2014. Meditative movement for respiratory function: a systematic review. *Respir. care* 59, 427–440.
- Mccall, M., Thorne, S., Ward, A., Heneghan, C., 2015. Yoga in adult cancer: an exploratory, qualitative analysis of the patient experience. *BMC complementary Altern. Med.* 15.
- Osadnik, C.R., Rodrigues, F.M.M., Camillo, C.A., Loeckx, M., Janssens, W., Dooms, C., Troosters, T., 2015. Principles of rehabilitation and reactivation. *Respiration* 89, 2–11.
- Papp, M.E., Lindfors, P., Wandell, P.E., Nygren-Bonnier, M., 2016. Effects of yogic exercises on functional capacity, lung function and quality of life in participants with obstructive pulmonary disease: a randomized controlled study. *Eur. J. Phys. Rehabil. Med.*
- Pomidori, L., Campigotto, F., Amatya, T.M., Bernardi, L., Cogo, A., 2009. Efficacy and tolerability of yoga breathing in patients with chronic obstructive pulmonary disease: a pilot study. *J. Cardiopulm. rehabilitation Prev.* 29, 133–137.
- Ranjita, R., Hankey, A., Nagendra, H., Mohanty, S., 2016. Yoga-based pulmonary rehabilitation for the management of dyspnea in coal miners with chronic obstructive pulmonary disease: a randomized controlled trial. *J. Ayurveda Integr. Med.* 7, 158–166.
- Raub, J.A., 2002. Psychophysiologic effects of Hatha Yoga on musculoskeletal and cardiopulmonary function: a literature review. *J. Altern. complementary Med.* 8, 797–812.
- Ray, U.S., Pathak, A., Tomer, O.S., 2011. Hatha yoga practices: energy expenditure, respiratory changes and intensity of exercise. *Evidence-based complementary Altern. Med.* eCAM 2011, 241294.
- Santana, M.J., J. S.P., Mirus, J., Loadman, M., Lien, D.C., Feeny, D., 2013. An assessment of the effects of Iyengar yoga practice on the health-related quality of life of patients with chronic respiratory diseases: a pilot study. *Can. Respir. J. J. Can. Thorac. Soc.* 20, e17–23.
- Schmalzl, L., Crane-Godreau, M.A., Payne, P., 2014. Movement-based embodied contemplative practices: definitions and paradigms. *Front. Hum. Neurosci.* 8, 205.
- Selman, L., Mcdermott, K., Donesky, D., Citron, T., Howie-Esquivel, J., 2015. Appropriateness and acceptability of a Tele-Yoga intervention for people with heart failure and chronic obstructive pulmonary disease: qualitative findings from a controlled pilot study. *BMC complementary Altern. Med.* 15, 21.
- Sendhilkumar, R., Gupta, A., Nagarathna, R., Taly, A.B., 2012. Effect of pranayama and meditation as an add-on therapy in rehabilitation of patients with Guillain-Barré syndrome—a randomized control pilot study. *Disabil. Rehabilitation* 35, 57–62.
- Shelov, D.V., Suchday, S., Friedberg, J.P., 2009. A pilot study measuring the impact of yoga on the trait of mindfulness. *Behav. Cogn. Psychother.* 37, 595–598.
- Troosters, T., Sciurba, F., Battaglia, S., Langer, D., Valluri, S.R., Martino, L., Benzo, R., Andre, D., Weisman, I., Decramer, M., 2010. Physical inactivity in patients with COPD: a controlled multi-center pilot-study. *Respir. Med.* 104, 1005–1011.
- Vestbo, J., Hurd, S.S., Agustí, A.G., Jones, P.W., Vogelmeier, C., Anzueto, A., Barnes, P.J., Fabbri, L.M., Martinez, F.J., Nishimura, M., Stockley, R.A., Sin, D.D., Rodriguez-Roisin, R., 2013. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease: GOLD executive summary. *Am. J. Respir. Crit. care Med.* 187, 347–365.
- Wadell, K., Janaudis-Ferreira, T., Arne, M., Lisspers, K., Stallberg, B., Emtner, M., 2013. Hospital-based pulmonary rehabilitation in patients with COPD in Sweden—a national survey. *Respir. Med.* 107, 1195–1200.
- Yang, Z.Y., Zhong, H.B., Mao, C., Yuan, J.Q., Huang, Y.F., Wu, X.Y., Gao, Y.M., Tang, J.L., 2016. Yoga for asthma. *Cochrane Database Syst. Rev.* 4, CD010346.