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PODCAST

McNaughton A, Weatherall M, Williams M, *et al.* Sing Your Lungs Out—a community singing group for chronic obstructive pulmonary disease: a 1-year pilot study. *BMJ Open* 2017;**7**:e014151. doi: 10.1136/bmjopen-2016-014151. **FREE ARTICLE**

On today's episode, I am excited to discuss an article published in the British Medical Journal (BMJ) Open in 2017, and this journal article is titled: Sing Your Lungs Out – a community singing group for chronic obstructive pulmonary disease: a 1-year pilot study. The primary author of this article is Amanda McNaughton from the Medical Research Institute of New Zealand, and she is also from the Department of Respiratory Medicine at the Capital and Coast District Health Board in New Zealand. This is an open access article, which means it is freely available – I will put the link in the show notes.

I was motivated to select this article for a journal club episode because I've seen a few research studies looking at the benefits of singing in pulmonary rehabilitation. Singing would be considered in this context an adjunct therapeutic intervention – it typically isn't meant to replace a key component of pulmonary rehab, but might offer additional benefits to participants if it is included.

In this study, which was conducted in Wellington, New Zealand, the overarching objective that this group was looking at was whether singing group participation was feasible and could benefit patients with chronic obstructive pulmonary disease (COPD). The authors describe several other studies that have looked at this question in the past, but one thing that they reinforce is that this is the first study to look at the feasibility of long-term participation, so over this whole year.

Why might singing be beneficial for people with COPD? The authors mention a few ideas. First, singing involves thoracic expansion (meaning that the diaphragm and external intercostal and accessory muscles are being used), active exhalation (meaning the abdominal and internal intercostal muscles are being used), and finally you would have good posture. I'd also like to mention that the nature of singing means a long expiratory phase, which is an element of breath control that you're familiar with! Therefore, the authors suggest that singing has the potential to improve breath control, and that may have an impact on hyperinflation and increased residual volume. I'll suggest that there are other potential benefits too, which I'll mention later on.

So let's talk a bit about how this study was organized.

The recruited people who had COPD or another chronic lung disease. At first, I was concerned when I read that they had analyzed everyone together, which might have been problematic as the interpretation of differences in lung function may have been quite different in different patient populations. But, no worries, they are only reporting, in this paper, those people who had COPD. So initially, all the people recruited in this study had already completed an 8-week, hospital-based PR programme, and then were subsequently enrolled in a weekly community

exercise class. The PR nurse invited the group to join the study. For people to have been initially enrolled in the PR programmes at the hospital, they needed to have a chronic lung disease and a modified Medical Research Council Dyspnoea Scale of at least grade 2. For listeners who aren't that familiar with that scale, it's a 5-level scale (0-4) that has different statements related to shortness of breath. A modified MRC of 2 means that the person indicated that they "walk slower than people of the same age because of dyspnea or they have to stop for breath when walking at their own pace". I'll a link in the show notes to this scale if you are not familiar with it. Patients included in this study had to be diagnosed with COPD based on The Global Initiative for Chronic Obstructive Lung Disease (GOLD), which requires an FEV₁/FVC of less than 0.70.

Patients were approached as a group not as individuals, and with 140 patients approached to be a part of this study, 112, so quite a few, patients declined, and 28 patients were enrolled, which is 20% enrollment. But after about a month there was some withdrawal, so that left them with 23 participants remained in the study for the full year. Of those, 2 didn't have COPD, leaving 21 for analysis.

What were the outcomes being assessed in this study?

The researchers conducted pulmonary function tests, the 6-min walk test, the Hospital Anxiety and Depression Scale (the HADS), and the Clinical COPD Questionnaire. The HADS has been used in many studies, and not just in hospital settings, and it is considered valid and reliable. It has 14 questions with higher scores indicating worse depression and/or anxiety. Another measure was the Clinical COPD Questionnaire which is a 10-item questionnaire which asks about symptoms, and how limited the person feels. Again, higher values indicate worsening health. The investigators also conducted tests to assess different measures of lung function. All of the data was collected at baseline, 4 months, and 1 year. They also conducted a six-minute walk test – just one, though, so not the normal required two times at baseline, so that wasn't really in line with research standards, but the comment about the patients having quite a bit of familiarity with this test was probably accurate.

Okay, the fun part – what was the singing? They created a group called Sing Your Lungs Out, which is a great name by the way, and they met 1 hour weekly throughout the length of the study. The 1-hour session included a 5-minute warm-up session, followed by 35 minutes of singing, followed by a 5-minute cool down, and then they had a 15-minute social time after that. And the songs sounded great, a real mix of genres, and they attention paid to the fact that, at least at the beginning, the group might be limited in how long they could withstand a long note or phrasing, so they picked the songs accordingly.

Then, they compared the results after the program with the values obtained before the program. Remember, there is no control group here, which is important when we interpret the results.

What did the results show?

66% of the participants had moderate COPD according to the GOLD criteria and 20% had severe or very severe COPD. So these were people with substantial disease. Yet despite this, people

kept with it. The mean attendance rate for the singing group intervention was over the 12 months was 85%, which is really impressive

Did any of their measures improve? I would say, somewhat. They report improvement in some measures of lung function, and in the six-minute walk test at 4 months, but not all were sustained at one year. Some of the other measures like the HADS and the COPD clinical questionnaire no differences between the pre and the post.

What were the limitations or strengths of this study?

The strengths of this study are really around high attendance and retention of the enrolled patients over the 1-year study. While they did not have a super high enrollment rate, the people that did enroll were motivated to stay, so there must have been a reason for that. They were getting something out of it. As well, the patients in this study were recruited from a typical hospital rehabilitation programme and the sing group was in a low-cost community setting which makes this a very practical and reproducible intervention. As well, previous studies of this kind have only lasted between 6-10 weeks, so a strength of this study is the longevity of this study, which is important when looking at the feasibility of this intervention long-term.

The authors state that the limitations of this study include that the 6-min walk test was only performed once per visit, which means that there is a possibility of a learning effect that could be a bias in the data, but as they mentioned, all participants had done at least one 6-min walk test in the past, so the hope was that this bias was minimized. They had a lot of statistical tests, so it is possible that some of the statistical differences that they reported could have just been by chance, and that does happen when you have a lot of tests that you are conducting and you are doing a lot of analyses, it is possible that you can find a statistical difference by chance even if there was no major difference between the pre and post. So that does happen, There are things that you can do statistically to try to reduce interpreting those results incorrectly, but they did not do that in this study.

But I actually think there was another limitation, and that was their choice of outcomes. For example, they wanted to look at improvements in lung function. That's fine, especially if you are interested in exploring the idea that singing reduces hyperinflation, it makes sense to look at measures of lung function to some degree. And I'm not a physiologist, but I do wonder if singing once a week would result in *permanent* changes to hyperinflation or to changes in residual volume at a test that is done at some other point in time. That seems like a tall order. Even pulmonary rehab, all together, hasn't shown to have change in lung function. And other interventions, such as pursed lip breathing during exercise, while it likely reduces dynamic hyperinflation during exercise that hasn't been shown to result in permanent changes to residual volume that I am aware of. Even the 6MWT, I don't think that the singing changes exercise performance per se, but possibly dyspnea changed with breath control, which enabled people to walk further. So, I think actually a dyspnea measure may have been helpful or reporting the Borg measure during the 6MWT if they took that measure would also have been helpful to get a sense about whether or not people had improvements in their breath control and their dyspnea levels and that may have affected exercise performance even if those things aren't easy to reflect in a pulmonary function test.

They also chose to measure the HADS, but as you can see the mean values were about 10, which when you interpret that test is at the top end of borderline abnormal. It would be interesting to know how many people in their sample actually had depression and anxiety, and if their scores went up or down (regardless of the stats said). It is possible that for the most part patients that were in this particular study did not really have a problem with depression or anxiety. But perhaps there were also different measures that could have really targeted what we might have thought the effect to be. The qualitative data that they reported in this particular study was really revealing, especially the comment: “it was worth the extra physical activity to get there”. So participation in this group really required extra physical activity, so that has its own benefits. And perhaps there is a measure, something related to participation, or social isolation that would have been really interesting to explore.

Now, sadly, singing has been shown to be a major problem with respect to spreading virus, so we probably won't be able to see this particular intervention role out in programs anytime soon. And singing online isn't really the same I don't think, I think you really benefit from having the volume of other people in close proximity. But I could be wrong about that 😊

Conclusion

Overall, this study supported the feasibility of long-term participation in community singing group for adults with COPD, for individuals who have completed pulmonary rehabilitation and are enrolled in weekly community exercise, so they are already pretty engaged in this particular sample of people. It will be interesting to see how these field develops with further research. I would suggest that singing likely can't replace physical exercise in terms of the important outcomes related to muscle strength and cardiovascular fitness, but as an adjunct, it has real potential at maintaining participation, improving quality of life, and perhaps also, improving dyspnea of people with COPD.

I hope you've enjoyed this episode, and perhaps you'll think of ways that you can bring singing into your pulmonary rehab program. And one further note, I loved that they brought in the community high school students and other groups and had concerts with them. That is another benefit that we should reinforce – the stigma, loneliness, and disengagement with community that many people with COPD face. This cross-generational approach likely had benefits for people and those students as well!

Until next time, stay well and keep moving, and singing! In a safe way of course 😊