Modelling Successful Self-Management in Adults With Cystic Fibrosis: Vicarious Self-Efficacy From Videos of ‘People Like Me’

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Abstract

Background
Self-efficacy is an important determinant of treatment adherence, and peer modelling of success can provide vicarious self-efficacy. A series of patient stories (‘talking heads’ videos) were developed with people with cystic fibrosis (CF) as part of the CFHealthHub multi-component adherence intervention, aiming to demonstrate success with daily therapy in ‘people like me’.

Methodology
One-to-one semi-structured interviews exploring patients’ experiences, barriers and facilitators of nebuliser adherence were audio and video-recorded between October 2015 and August 2016. Interview transcripts were reviewed to identify descriptions of problem-solving and sustained treatment success. Positive stories potentially providing vicarious descriptions of success were selected as video clips.

Results
In total, 14 adults with CF were recruited from five UK CF centres. Each participant contributed a median of five (interquartile range: 3-6) video clips, and a total of 57 unique clips were uploaded onto the CFHealthHub digital platform. Nine of those clips spanned two categories, hence, there were 66 clips across 16 categories.

Conclusions
The videos were well received though some adults were concerned that comparisons with peers might create anxiety by highlighting the possibility of future decline or current relative underperformance. It is important to sensitively support choice when providing resources aiming to increase vicarious self-efficacy. Our experience may guide the development of similar videos for people with other long-term conditions.

Introduction
Cystic fibrosis (CF) is a genetic condition where thick mucus in the lungs and digestive system leads to progressive lung damage and malabsorption of nutrients. It is an archetypal long-term condition; there is as yet no cure for CF but highly efficacious medications exist. However, medication adherence is low in the range of 35-50% among adults with CF [1,2]. Developing effective adherence interventions will address an important unmet need [3,4] and is one of the top 10 CF research priorities [5].

The CFHealthHub digital Learning Health System (https://www.cfhealthhub.com/, ISRCTN14464661) is an improvement collaborative among 17 UK adult CF centres in which technical, behaviour change and implementation science approaches are explicitly used to learn and improve. Within a learning health system, patients can contribute new knowledge because data on all patients are routinely captured as an integral by-product of care delivery, and the capture of patient experience and best practices are seamlessly embedded in the care delivery process. At the heart of the Learning Health System is a tailored multi-component intervention to help people with CF master self-care with inhaled therapies using a digital platform supported by healthcare professionals. This multi-component intervention [6], called the CFHealthHub, used the eFlow Technology nebulisers with eTrack data-logging controllers (PARI Pharma GmbH, Starnberg, Germany) to capture objective adherence data. This was displayed for participants and
interventionists on the CFHealthHub website and app. Interventionists underwent training and assessment (face to face and via Blackboard virtual learning environment [VLE]) enabling them to use CFHealthHub resources and behaviour change techniques to support participants with nebuliser adherence.

A 19-centre randomised controlled trial (RCT) showed that the CFHealthHub intervention achieved higher objectively measured adherence and lower perceived treatment burden sustained up to 80 weeks [7]. The CFHealthHub conceptual framework extends the Capability, Opportunity and Motivation (COM-B) model [8], which posits that capability, opportunity and motivation are necessary factors to perform any behaviour and create the habits of self-care.

Each of the COM-B domains may be subdivided, for example, motivation may be automatic (e.g. habit of using nebuliser) or reflective (e.g. beliefs about treatment). Self-efficacy, or a person’s perception of his/her capabilities to perform a behaviour [9], is a crucial component of reflective motivation. People with long-term conditions and high patient activation (knowledge, skills and self-efficacy) use less unscheduled care [10]. The lack of self-efficacy is an important barrier to CF medication adherence [11].

Self-efficacy can be increased through the sharing of vicarious experiences of success provided by social/peer role models because seeing people similar to ourselves succeed raises our beliefs that we can also succeed [9]. For example, if a person with CF is about to go to university watching a video of a person like them who found ways to sustain self-care while at university can increase confidence that ‘if others who are like me could succeed, I can also succeed’.

The CFHealthHub group, therefore, worked with the University of Oxford Health Experiences Research Group (HERG) to develop a set of ‘talking heads’ videos as part of the CFHealthHub multi-component intervention. HERG collects patient experiences of care pathways to familiarise others with the treatment journey. In the collaboration between the CFHealthHub group and HERG, the focus was on the challenge of the success of preventative self-care. The ‘talking heads’ videos aim to increase vicarious self-efficacy in success with daily inhaled treatments by showing a range of different types of people with CF managing or increasing their adherence. Thus, the videos provide a library of strategies used for successful self-care. This paper describes the method of selection and production of the ‘talking heads’ videos.

**Materials And Methods**

The methodology used to develop the ‘talking heads’ videos is summarised in Figure 1. Semi-structured interviews to explore patients’ experiences of managing inhaled treatments were audio and video-recorded. Regulatory approval for this study was obtained from London - Camden & Kings Cross NHS Research Ethics Committee (reference number: 15/LO/0944).
Purposive sampling was conducted using the CF registry and clinical records to identify people with CF aged ≥16 years who fulfilled the inclusion criteria (Table 1). Clinical care teams in seven UK adult CF centres provided potential participants with a participant information sheet during clinic or by post. The target recruitment was 15-20 people.
Inclusion criteria

- Diagnosis of cystic fibrosis and age ≥16 years
- Reasonably stable objective adherence of >60% or sustained increase in objective adherence >2 months
- Sufficiently self-aware to understand and describe their strategies to sustain adherence or what prompted their efforts to improve adherence

Exclusion criteria

- Pregnancy
- Post-lung transplantation
- On an active lung transplant list
- In the palliative phase of their disease

**TABLE 1: Inclusion and exclusion criteria of the study.**

Participants provided written informed consent prior to data collection, including permission for audio and video recording. Demographic data were obtained from patient notes. One-to-one, face-to-face interviews lasting 45-60 minutes were performed by a HERG qualitative researcher (SK) in participants’ homes between November 2015 and August 2016. The topic guide (Appendix A) was designed to explore participants’ experiences of living with CF, to reflect on times when nebuliser adherence had been lower, and how and why the use of nebulised medication subsequently improved. Data were collected and analysed concurrently.

Following each interview, audio recordings were transcribed verbatim by a HERG transcriber. The interview transcripts were sent to participants who had the option of removing any sections that they wished prior to analysis.

Final transcripts were reviewed by the CFHealthHub research team (MH, MA, SD, CM, HC, MW) to identify sections that demonstrated talk about making positive changes to adherence, reflections on difficult times and overcoming challenges or examples of problem-solving that enabled sustained adherence. The research team focused on positive stories with the potential to provide vicarious descriptions of success likely to increase self-efficacy. The sections chosen were relatively short so that the resultant videos were not too time-consuming to watch. Highlighted transcripts were then sent back to SK for HERG to extract relevant video clips from video recordings.

The research team reviewed the extracted clips. Transcripts of clips considered suitable for inclusion were sent to participants seeking permission to publish the video clips on the CFHealthHub digital platform. Participants had the option of being identified by their first names in the video library or using a pseudonym. Following confirmation of the agreement, a website delivery manager from HERG did the final editing of selected video clips and uploaded them onto the CFHealthHub platform.

The main content of the selected video clips, for example, ‘advice to younger self’ was identified and used to tag the episode in CFHealthHub. The research team (which included a person with CF) identified gaps in the ‘library’, and purposive sampling was used to try to include as yet missing experiences identified as important, such as managing CF whilst at university or as a parent caring for a young child.

The research team sorted the final version of the video clips into different categories to organise the CFHealthHub digital platform video library. For ease of use, the categories were searchable within the digital platform, and each clip also had searchable hashtags, for example, #uni alongside the video thumbnails. The video library was reviewed by the Patient & Public Involvement group of CFHealthHub, who suggested short descriptions for each video clip to accompany the thumbnails. The video clips are only available for participants of the CFHealthHub digital Learning Health System (https://www.cfhealthhub.com/), who can access the video clips by logging onto the CFHealthHub website or app.

**Results**

Among the 14 participants, six (42.9%) were females, and the median age was 27 years (interquartile range (IQR): 25-33 years) (Table 2). There were 66 indexed video clips based on a total of 57 unique ‘talking heads’ video clips, with nine of those clips spanning two categories. There were 16 categories for the video clips. The numbers of video clips and the number of views from the CFHealthHub website during the ACTIF RCT for each category are summarised in Table 3. Each participant contributed a median of five video clips (IQR: 3-6 clips). One video clip initially selected based on transcript review was later omitted following a viewing. The main strategies identified by participants to help support sustained nebuliser use are summarised in Table 4.
Further descriptions of the videos are in Appendix B.

| Demographic parameter          |       |
|--------------------------------|-------|
| Age in years, median (range)   | 27 (20 to 57) |
| Gender                         |       |
| Female, n (%)                  | 6 (42.9) |
| Male, n (%)                    | 8 (57.1) |
| Ethnicity                      |       |
| White British, n (%)           | 13 (92.9) |
| White – others, n (%)          | 1 (7.1) |
| Employment status              |       |
| Employed, n (%)                | 11 (78.6) |
| Full-time carer, n (%)         | 1 (7.1) |
| Unemployed, n (%)              | 2 (14.3) |
| Education level                |       |
| Post-graduate, n (%)           | 1 (7.1) |
| Degree, n (%)                  | 5 (35.7) |
| Secondary school, n (%)        | 3 (21.4) |
| Unknown, n (%)                 | 5 (35.7) |
| Number of dependents           |       |
| 1, n (%)                       | 13 (92.9) |
| 0, n (%)                       | 1 (7.1) |
| Referring site                 |       |
| King's College Hospital London, n (%) | 4 (28.6) |
| Manchester, n (%)              | 3 (21.4) |
| Oxford, n (%)                  | 2 (14.3) |
| Sheffield, n (%)               | 4 (28.6) |
| York, n (%)                    | 1 (7.2) |

TABLE 2: Demographics of the participants (n = 14).
| Categories                        | Number of video clips | Number of views from the CFHealthHub website* during the ACTiF RCT |
|----------------------------------|-----------------------|---------------------------------------------------------------|
| Advice to younger self           | 3                     | 27                                                            |
| Coping with feeling low          | 3                     | 41                                                            |
| Juggling treatment and life      | 14                    | 187                                                           |
| Going to university              | 3                     | 18                                                            |
| The importance of nebulisers     | 10                    | 85                                                            |
| Keeping motivation up            | 7                     | 77                                                            |
| Having a routine                 | 7                     | 15                                                            |
| Finding support                  | 2                     | 8                                                             |
| Nebuliser tips                   | 1                     | 10                                                            |
| Having a normal life             | 6                     | 89                                                            |
| Being normal                     | 1                     | 9                                                             |
| Advice to others                 | 2                     | 26                                                            |
| Late diagnosis                   | 1                     | 8                                                             |
| Growing up with cystic fibrosis  | 3                     | 12                                                            |
| General tips                     | 1                     | 4                                                             |
| Talking to others                | 2                     | 6                                                             |

**TABLE 3:** Different categories of the video clips and the number of views from the CFHealthHub website during the ACTiF RCT for each category,

* The number of views via the CFHealthHub app is unavailable.
Strategies

Be open and honest with yourself about how you are coping

Do not be afraid to ask for help, and talk to your healthcare team

Do not hide the fact you’ve got cystic fibrosis from others*

Build a routine that works for you and fits in with your own life

Set goals and gain satisfaction from achieving them

Note down the differences you feel when you are adhering well compared with when you are not

Seeking support from other people, e.g. friends, family or your healthcare team

If things are difficult, focus on some short-term goals

Think about how you want your life to be in the future, both short and longer-term

Keep your nebuliser charged; get into the routine of charging it after every use

Do not underestimate your illness or take it for granted that you’ll always feel healthy

You are the person who is in control, it is your responsibility to keep yourself well so make changes to ensure you stay as healthy as you can

| TABLE 4: Strategies identified by participants to help with adherence. |
|---|
| * Disclosing cystic fibrosis symptoms and diagnosis is associated with higher social support, social functioning and medication adherence self-efficacy whilst limited disclosure may have a negative impact on psychosocial outcomes [12]. |

Discussion

Adapting a proven methodology developed by HERG to create videos for other long-term conditions such as asthma, diabetes and epilepsy, we have produced a series of ‘talking heads’ videos that are hosted on the CFHealthHub digital platform to support habit formation with inhaled therapies. These videos extend the multi-component behaviour change toolkit available within CFHealthHub by providing videos of positive role models and allowing CFHealthHub users insight into the experiences of others overcoming the daily challenges of living with CF. In a 607-participant multi-centre RCT, the multi-component CFHealthHub intervention was shown to achieve higher objectively measured adherence to inhaled medications sustained over 12 months, higher body mass index and lower perceived CF treatment burden, without increasing anxiety [7]. The trial was not designed to determine the relative effectiveness of the various intervention components, nonetheless, the ‘talking heads’ videos are an integral component of the CFHealthHub intervention.

There is emerging evidence for the role of peer modelling to increase self-efficacy and promote behaviour change in other long-term conditions. An RCT evaluating videos of patient narratives about their individual struggles and successful hypertension management showed improved blood pressure among people with uncontrolled hypertension [13]. It is thought that the use of patient narratives resonates better among patients and decreases cognitive resistance to behaviour change messages [11]. People with long-term conditions may better identify with fellow patients who are close to themselves and share similar characteristics compared to actors or health professionals conveying factual information. Messages from other ‘people like me’ can help to promote confidence and reduce self-doubt.

‘People like me’ who have successfully managed behaviour change and achieved good health outcomes can also be thought of as ‘positive deviance’. Positive deviance refers to at-risk individuals who have figured things out for themselves and are able to follow beneficial practices that are uncommon within the community, thus achieving better outcomes in a population that shares similar risks [14]. The positive deviance approach has been shown to be successful in inspiring enthusiasm for improvement in other long-term conditions [14].

We found that a key motivation for people with CF who participated in interviews to develop these videos was a desire to help others who may be struggling with similar problems by sharing their experiences. Talking openly about their previous barriers, as well as how they had overcome them, was something they felt might benefit others. In addition to the ‘talking heads’ videos, the content of the interview transcripts also generated valuable insights into difficulties that people with CF often face in motivating themselves and overcoming barriers to adhere to nebulised treatment. Useful strategies were shared such as setting
achievable goals coupled with rewards for achievement also the importance of finding a treatment routine that fits around the life of the person indicating the necessity for individually tailored approaches to adherence support.

In our study, there were interesting differences in emphasis when transcripts alone were compared with transcripts viewed alongside video recordings. This discrepancy highlights the importance of developers watching the video in full to ensure all relevant clips are utilised. It may be beneficial for others carrying out similar work to watch the video in full to ensure all relevant clips are utilised. The sample size of this study was limited by budget and time constraints, so we may not have reached saturation in barriers and solutions sampled. While participants using CFHealthHub generally welcomed the video library, some preferred not to view videos to avoid comparison with people like them who have more severe CF or people like them who seemed healthier [15]. Although all participants in the RCT intervention arm had access to the video library, we emphasised that video viewing was optional in recognition that some people with CF prefer to avoid social comparison [16].

Conclusions

We have developed 'talking heads' videos to support behaviour change as part of a complex adherence intervention. The 'talking heads' videos aim to increase vicarious self-efficacy with using daily inhaled treatments by showing a range of people with CF managing or increasing their adherence. These videos broaden the behaviour change intervention of CFHealthHub by providing positive role models and allowing CFHealthHub users insight into the experiences of others with CF. Some but not all those who have used the CFHealthHub digital platform have found the videos to be helpful. It is important to sensitively support choice when providing resources aiming to increase vicarious self-efficacy. Our experience may guide the development of similar videos for people with CF and other long-term conditions.

Appendices

Appendix A: A topic guide for the one-to-one, face-to-face, semi-structured interviews

| Topic guide |
|-------------|
| We are particularly interested to hear about your experiences with nebuliser treatment and to find out more about how you have improved your use of a nebuliser |
| Part 1: Tell me what it was like when your nebuliser adherence was poor • why was it poor? • did you understand the importance of good nebuliser adherence? • what stopped you from adhering? • what was your health like then? • how did you feel when you weren't adhering? |
| Part 2: Can you tell me about how you improved your use of the nebuliser? • what prompted you to change? • what strategies did you use to change? • what did you do when things were difficult? |
| Part 3: I'd like to find out more about how things are for you now. • how are you managing your adherence now? • how is your health? • how do you feel? • what has your improved adherence enabled you to do that you couldn't before? |
| Part 4: Thinking about your own experience, what advice would you give to other similar people or your younger self with CF? • about how to start to make changes? • what to do when things go wrong? are difficult? • how to keep your motivation going? |

TABLE 5: A topic guide for the one-to-one, face-to-face, semi-structured interviews.

Appendix B: Further description of the ‘talking heads’ videos

| Categories            | Examples of video descriptions created by the PPI group | Quotes |
|-----------------------|---------------------------------------------------------|--------|
| Advice to younger self| XXX talks openly about the risks of underestimating his condition, missing treatment and how you are the person who can make the biggest positive change | 'If I was talking to my younger self, personally I would say, don’t underestimate your illness and don’t take for granted that you’re ok, because I was ok, but the reason, probably the reason why I was ok is because I was doing plenty of treatment, plenty of exercise, uh, and then as soon as I had to manage that myself, it just kind of dropped off and so you can say that over time you, you’re likely to deteriorate a bit but it does, it has, come hand in hand with not looking after myself as well as I was being looked after when I was a child growing up' |
| Coping with feeling    | There will always be peaks and troughs with CF, it’s important to ‘…out of the trough, you will come out on the other side and actually it’s just a re-focus, |
XXX talks about how seeing adherence data motivates him and supports what he wants to achieve in life.

"If I go in and see my adherence is only 60%, 65% it gives me a bit of a kick thinking, I'm not doing it as well as I should, as well as I think I am, I need to really up it and make sure I am doing things'.

When I was a teenager I thought I had a grasp on it, but that's only because my mum had a grasp on it, and then I quickly realized and kind of learnt that I don't, at all, have a grasp of it'.

If you do adhere and you do use your nebulisers, then maybe you won't have to have IVs as much, which is a million times worse than nebulisers'.

'it not a chore, it's helping me, saving me really, and to see it as a chore is the first mistake'

I don't think anyone will ever understand as much as someone who's going through the same thing you're going through ...definitely talk to other people who are going through the same thing'

…but if you don't keep it clean and sterile as much as you should, umm, it takes longer because the filters get blocked and then the longer it takes the more, the less likely I am to do, um, to do my nebuliser really, so you're your own worst enemy in that sense'

'my night time one's I know will always get done because I'll do them in bed, kind of enjoy that little extra half an hour in bed as well…'

I carry a Lucozade bottle around with me, um, and if I cough something up I can make it look like I'm taking a drink from the bottle, but in reality I'm actually spitting out what I've just coughed up off my lungs into the bottle ...
Talking to others experience. Hearing stories from those who are much older with CF has also made him feel much more positive about life expectancy. positive on my outlook on life, and it’s given me something to strive for. If I look after myself now, I’ll live longer’

TABLE 6: Further description of the ‘talking heads’ videos.

Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. London – Camden & Kings Cross NHS Research Ethics Committee issued approval 17/LO/0032. Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: This report presents independent research funded by the NIHR under its Grants for Applied Research Programme (RP-PG-1212-20015). The views and opinions expressed are those of the authors and do not necessarily reflect those of the NHS, the NIHR, Medical Research Council (MRC), Central Commissioning Facility (CCF), the Programme Grants for Applied Research Programme or the Department of Health and Social Care. Financial relationships: P Whelan declare(s) Funding for software development from PARI Pharma GmbH. The University of Manchester software team (P Whelan) received funding from PARI Pharma GmbH to create a medication reporting component within the CFHealthHub software. This has not had any direct influence on the findings reported here. P Whelan declare(s) employment from Affigo CIC, Prism Life Ltd. P Whelan also reports consultancy fees from Affigo CIC (a digital mental health company) in which she is a director and other fees from Prism Life Ltd. (a small research and consultancy company) in which she is the sole owner-director. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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