


Digital habits of pulmonary rehabilitation service-users following the COVID-19 pandemic

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Abstract

Objective: We previously demonstrated low levels of digital literacy amongst pulmonary rehabilitation service-users prior to the COVID-19 pandemic. We aimed to identify whether the pandemic accelerated digital literacy in this population, resulting in greater acceptance of remote web-based pulmonary rehabilitation programme models.

Methods: We surveyed digital access and behaviours and pulmonary rehabilitation delivery preferences of service-users referred to pulmonary rehabilitation in 2021 (cohort 2021) and propensity score-matched them to a cohort who completed the survey in 2020 (cohort 2020).

Results: There were indicators that digital access and confidence were better amongst the Cohort 2021 but no difference was seen in the proportion of patients choosing remote web-based pulmonary rehabilitation as an acceptable method of receiving pulmonary rehabilitation.

Conclusion: In an unselected cohort of service-users, remote web-based pulmonary rehabilitation was considered acceptable in only a minority of patients which has implications on healthcare commissioning and delivery of pulmonary rehabilitation.

Keywords

Pulmonary rehabilitation, home-based rehabilitation, chronic lung disease, digital literacy, COVID-19

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Introduction

The COVID-19 pandemic, and the necessary social distancing and infection prevention measures taken to reduce transmission, has impacted on the ability to deliver traditional face-to-face outpatient pulmonary rehabilitation. In many other areas of healthcare, including primary and specialist care, there has been a rapid progression from face-to-face outpatient visits to remote video consultations. However, studies undertaken prior to the COVID-19 pandemic have shown low levels of digital literacy amongst pulmonary rehabilitation service-users, which may have implications for

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Table 1. Digital habits and pulmonary rehabilitation delivery preferences.

| | Cohort 2020 | Cohort 2021 | |
|---|----------------------|----------------------|---------|
| Q: Do you use the internet regularly? | n = 99 (n (%)) | n = 101 (n (%)) | p-value |
| Every day | 52 (52) | 60 (59) | 0.39 |
| 4–6 times a week | 4 (4) | 8 (8) | 0.37 |
| 1–3 times a week | 9 (9) | 10 (10) | 0.99 |
| Less than 1 a week | 1 (1) | 4 (4) | 0.37 |
| Less than 1 a month | 2 (2) | 2 (2) | 0.99 |
| Never | 31 (31) | 17 (17) | 0.03 |
| Q: How confident are you using the internet? | n = 91 (n (%)) | n = 100 (n (%)) | |
| Extremely | 17 (19) | 30 (30) | 0.09 |
| Quite | 36 (39) | 31 (31) | 0.14 |
| Need help from family | 10 (11) | 15 (15) | 0.52 |
| Not confident | 28 (31) | 24 (24) | 0.33 |
| Q: What do you use the internet for? (Multiple choice) | (n (%)) ^a | (n (%)) ^a | |
| Emailing | 50 (55) | 69 (69) | 0.13 |
| Skype/videoconferencing | 17 (20) | 40 (40) | <0.01 |
| Browsing news | 54 (63) | 65 (65) | 0.76 |
| Shopping | 39 (45) | 61 (61) | 0.04 |
| Browsing health related information | 23 (27) | 37 (37) | 0.16 |
| Q: If you were referred for pulmonary rehabilitation how would you like it delivered? (Multiple choice) | (n (%)) ^a | (n (%)) ^a | |
| Supervised in a gym | 46 (47) | 65 (65) | 0.02 |
| Supervised in a community centre | 45 (46) | 60 (60) | 0.09 |
| Home exercise booklet with weekly phone calls | 11 (11) | 20 (20) | 0.12 |
| Web-based/Videoconferencing with supervision | 14 (14) | 15 (15) | >0.99 |

^aRespondents could mark more than one answer as they were multiple choice questions. Data reported as n (%).

delivering remote web-based pulmonary rehabilitation.¹ We hypothesised that the COVID-19 pandemic would accelerate digital literacy amongst those referred for pulmonary rehabilitation, resulting in greater acceptance of remote web-based pulmonary rehabilitation options.

Methods

From March 11th 2020, the Harefield Pulmonary Rehabilitation Unit suspended all services, but reopened remote non-face-to-face services from June 29th 2020. This included an eight-week, twice-weekly, supervised group-based exercise and education classes delivered on a video-conference platform and one unsupervised exercise session) and a telephone-based programme² (thrice-weekly exercise programme with weekly telephone supervision and education booklet). Full services, including face-to-face assessments and traditional pulmonary rehabilitation programmes³ (eight-week twice-weekly supervised outpatient programme of exercise and education with one unsupervised exercise session) were offered from September 21st 2020. We initiated a survey of those referred to the Harefield Pulmonary Rehabilitation service between February and March 2020 (Cohort 2020) and

repeated the same survey in those referred between February and March 2021 (Cohort 2021) as part of a clinical service evaluation. The survey was anonymised and comprised basic demographic details, questions on web access, confidence and usage as well as pulmonary rehabilitation delivery preference. People in Cohort 2020 were matched to people in Cohort 2021 using 1:1 propensity score matching² (nearest neighbour method) accounting for age, sex, primary lung disease and multiple deprivation index. Data were summarised using descriptive statistics. Between-group differences were analysed using Fisher's exact test, independent t-test or Mann Whitney-U test as appropriate.

Results

Of 137 patients approached from Cohort 2021, 101 completed the survey. Baseline characteristics of Cohort 2020 versus Cohort 2021 were: 48% versus 57% male; median age (25th, 75th centile) 74 (63, 77) years versus 74 (64, 78) years; 73% versus 68% with COPD as primary diagnosis; and mean (standard deviation) index of multiple deprivation decile 6 (2) versus 6 (2) (10: least deprived). Balance diagnostics demonstrated that the groups were

well-matched for these variables (standardised mean difference <0.1).

Table 1 summarises the digital habits of people referred for pulmonary rehabilitation in the two cohorts. There were indicators that digital literacy was better amongst the Cohort 2021 with an increasing proportion who had ever accessed the Internet ($p = 0.033$) and a trend to more reporting being extremely confident with Internet use ($p = 0.09$). Furthermore, significantly greater number of patients in Cohort 2021 were using the internet for videoconferencing and shopping (<0.01 and 0.04 respectively). Despite this, no difference was seen in the proportion of patients choosing web-based/videoconferencing as an acceptable method of receiving pulmonary rehabilitation (Cohort 2020 14% versus Cohort 2021 15%; $p > 0.99$).

Discussion

This is the first study to survey pulmonary rehabilitation service-users on their digital habits and literacy skills during the COVID-19 pandemic. The main findings of our study are that there were several indicators to show that digital literacy skills may be better amongst those currently on pulmonary rehabilitation waiting lists compared with before the COVID-19 pandemic. However, this did not translate to an increase in patient preference for web-based pulmonary rehabilitation.

Several reasons may explain the limited patient preference for video-based pulmonary rehabilitation. Although it was reassuring to see that some digital literacy metrics had improved, only 30% from Cohort 2021 reported feeling extremely confident using the Internet, and it is likely that an even smaller proportion would have the confidence to use the Internet for healthcare purposes. Other than technical difficulties (the most cited reason for poor uptake and acceptance of telehealth interventions), it is plausible that many patients simply prefer face-to-face supervised centre-based pulmonary rehabilitation. This has been corroborated in previous trials of home-based pulmonary rehabilitation where recruitment rates were low as a significant proportion declined participation as they wanted to attend conventional centre-based pulmonary rehabilitation.⁴ Qualitative studies have pointed to the potential benefits of social interaction in centre-based pulmonary rehabilitation, including the importance of the interaction between the healthcare professional and patient. Furthermore, the median age in both cohorts was 74 years; although this age is representative of people referred for pulmonary rehabilitation, it is plausible that younger populations may be more skilled in using and accessing technology and as such may find Internet-based pulmonary rehabilitation programmes more acceptable.

A limitation of the study is that the findings are based on a single-centre and may not be generalisable to other pulmonary rehabilitation services. Cohorts 2020 and 2021 were independent so although there was matching for

relevant variables using a validated statistical method, we cannot exclude that our observations were secondary to differences in confounding factors (unaccounted for during matching) or due to referrer bias. These factors might include distance from the centre, availability of transportation, access to home exercise equipment, appropriate space to exercise at home or previous experience of centre-based pulmonary rehabilitation. Nevertheless, it was interesting to observe that in the unselected contemporary Cohort 2021, web-based pulmonary rehabilitation was considered acceptable in only 15% of patients. This has implications on healthcare commissioning and delivery of pulmonary rehabilitation.

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Author contributions

Concept and Design of Study: WD-CM, CMN; Acquisition of Data: OP, REB, SP, JAW; Analysis of Data: OP, WD-CM, CMN; Drafting of Manuscript: OP, WD-CM, CMN; Revision of manuscript critically for important intellectual content: All authors; Approval of final manuscript: All authors

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