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Research Article

# Views of healthcare workers to help develop support for people with post-COVID syndrome in Nigeria: a survey study

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## Abstract

**Background:** Existing pulmonary rehabilitation services have been adapted to accommodate the excess demands for support for people with post-coronavirus disease syndrome. For many low- and middle-income countries, where pulmonary rehabilitation is not routinely available, interventions specific to local contexts are needed.
**Objective:** This study aimed to examine the views of healthcare workers in Nigeria on ways to support individuals' recovery from post-coronavirus disease syndrome.
**Design:** An online survey repeated at two time points during the pandemic via social media.
**Setting:** Data collection occurred in April–July 2020 and January–July 2021, coordinated from Abuja, Nigeria.
**Participants:** A convenience sample of healthcare workers voluntarily completed the survey without any time constraints.
**Main outcome measures:** The survey comprised closed and open-ended questions, in English, with free text boxes for additional comments where necessary. The survey included questions on the key components of post-coronavirus disease support; appropriate location, timing and communication strategies; barriers to healthcare workers referring patients; and perceived barriers to patients accepting a referral.
**Results:** Two hundred and two fully completed responses were received from healthcare workers (52% male, 53% physiotherapists). The majority (88%) recommended support of hospitalised and non-hospitalised patients with home (57%) or community-based (70%) interventions combining video (57%) and telephone (74%) support. Priority components were aerobic exercise (69%), coping with the stigma of infection (68%), advice on nutrition (68%) and integrating back into the community (63%). Healthcare worker-perceived patient barriers to accepting support were cost of treatment (64%), patient stigmatisation (63%) and risk of patient re-infection (53%). The main healthcare worker barrier in referring patients was inadequate personal protective equipment (63%).
**Limitations:** This exploratory survey study recruited a convenience sample, was available only online and relied on social media for uptake, leading to probable selection bias. Limitations in staffing and resources meant that people with post-coronavirus disease syndrome were not recruited.
**Conclusion:** Post-coronavirus disease support was viewed as a high priority by healthcare workers in Nigeria. These results act as a foundation for developing suitable support interventions for post-coronavirus disease survivors with ongoing symptom burden. The suggested structure, content and delivery of post-coronavirus disease support fits well with the conventional structure of pulmonary rehabilitation.
**Future work:** The development of post-coronavirus disease support interventions in Nigeria.
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## Introduction

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has caused devastation to individuals, healthcare systems and economies, with the greatest difficulties faced by low- and middle-income countries (LMICs).[1,2] As of 10 April 2021, there were 134,719,328 cases of SARS-CoV-2 and 2,915,972 deaths globally.[3] On the 27 February 2020, the first case of the novel coronavirus disease (COVID-19) was detected in Nigeria – the first reported case in sub-Saharan Africa.[4] Since then, Nigeria, the most populous country in Africa with more than 210 million people,[5] has recorded 163,652 cases and 2059 deaths (as of 10 April 2021).[3] These figures likely underestimate the true burden due to limited testing and asymptomatic infections going undetected. With much of the immediate attention rightly focused on individuals in the acute and subacute phases of SARS-CoV-2 infection, the world is now starting to turn its attention to the longer-lasting impact on survivors – termed post-COVID syndrome.[6,7] Post-COVID syndrome has been defined by the National Institute for Health and Care Excellence (NICE) not as one condition, but 'signs and symptoms that develop during or after an infection consistent with COVID-19 which continue for more than 12 weeks and are not explained by an alternative diagnosis'.[6]

Growing global evidence profiles the prevalence of post-COVID syndrome and the common persistent symptoms among survivors.[8–12] A systematic review and meta-analysis of 15 studies exploring the long-term effects of SARS-CoV-2 estimated that 80% of 47,910 SARS-CoV-2 survivors developed at least one long-term symptom, most commonly fatigue (58%), headache (44%), attention disorder (27%), hair loss (25%) and dyspnoea (24%).[12] Data from the UK showed that more than 70% of people hospitalised with SARS-CoV-2 infection are not fully recovered after 1 year,[11] with hospitalised patients at greater risk of experiencing long-term symptoms.[13,14] The longer-term consequences of infection are on a scale that could overwhelm healthcare systems, especially in LMICs.[15] In a cohort study following up 274 survivors from an outpatient clinic in Lagos State, Nigeria, 40% remained symptomatic for ≥ 2 weeks post discharge.[15] The most common persistent symptoms were fatigue, headache, chest pain and insomnia.[16] While the exact pathophysiology of post-COVID syndrome is not yet fully understood, there is a clear need to support people's recovery and help them return to their usual way of life.

In high-income countries, where there are existing rehabilitation services and infrastructure, adaptations to pulmonary rehabilitation (PR) have been made to accommodate the excess demand to support people with post-COVID syndrome.[16,17] Pulmonary rehabilitation is:

> *[A] comprehensive intervention based on a thorough patient assessment followed by patient-tailored therapies that include, but are not limited to, exercise training, education, and behavior change, designed to improve the physical and psychological condition of people with chronic respiratory diseases and to promote the long-term adherence to health-enhancing behaviors.*[18]

For many LMICs, where PR is not routinely available or widely investigated,[19] dedicated interventions will need to be developed. Furthermore, examinations of the effectiveness of rehabilitation on health status, persistent symptoms and physical limitations have been viewed as international research priorities.[20] Early evidence for rehabilitation in this population is promising.[21,22] There are some rehabilitation services available in Nigeria on which to build,[23] but there is also a clear need to develop interventions specific to people with post-COVID syndrome in local contexts.

Accordingly, this study aimed to examine what post-COVID syndrome support should look like in Nigeria, specifically views on the optimal timing, suitable delivery methods, content of the support and obstacles to implementation.

## Methods

### *Study design and setting*

Online surveys of healthcare workers (HCWs) were conducted. The survey was designed by the National Institute for Health and Care Research (NIHR) Global RECHARGE Group for Pulmonary Rehabilitation (17/63/20), with ethical approval obtained from the University of Leicester, UK (reference: 24736), and is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.[24]

### *Community engagement and involvement*

The questionnaire was tested with HCWs in Nigeria and the UK prior to the start of data collection. This work was carried out to better understand the opinions of COVID-19

patients to improve the quality of their care. The results of this study may inform the development of interventions to support people post COVID in Nigeria.

### *Recruitment and data collection*

Recruitment activities were co-ordinated from Abuja, although the online nature of the survey meant respondents could be from any state in Nigeria. The survey was distributed via social media platforms, including relevant HCW-specific WhatsApp groups (e.g. physiotherapy communities) and Twitter (e.g. tagging relevant HCW associations). Participants confirmed their willingness to engage in this research by accessing and completing the online survey. All participants completed the survey without any time constraints.

The survey was conducted in two rounds (*Figure 1*). The first round started on 28 April 2020 and ended on 14 July 2020, during which time there were 1532 confirmed COVID-19 cases, 255 discharged cases and 44 deaths in Nigeria.[25] The second round of survey responses commenced on 18 January 2021 and ceased on 4 July 2021, during which a total of 121,566 confirmed cases, 97,228 discharge cases and 1504 deaths were registered in the country.[25] Two rounds of survey were conducted to enable comparison of responses between early and later phases of the COVID-19 pandemic. Although similar recruitment strategies were used in both rounds, participation in the survey was voluntary and anonymous, preventing any linking of responses between the two rounds. Survey responses were only collected if respondents reported being over 18 years of age, residing in Nigeria and with a healthcare profession as their occupation.

The survey was deployed using OnlineSurveys® (Jisc, Bristol, UK) (www.onlinesurveys.ac.uk) and comprised 16 closed or open-ended questions, in English, with free text boxes for additional comments where necessary. A copy of the survey is available in *Report Supplementary Material 1*. The initial section of the questionnaire asked for basic demographic information from the participants, including age, gender, professional background and their responsibilities for COVID-19 patients. Remaining questions included the key components of post-COVID support; appropriate location, timing and communication strategies; barriers to HCWs referring patients; perceived barriers to patients accepting a referral and how to overcome them; and the value of supporting post-COVID-19 recovery.

Data were reported as frequencies and percentages (%) with no inferential statistics due to the descriptive nature of the study. Data were analysed using Microsoft Excel® (Microsoft Corporation, Redmond, WA, USA) and summary reports from OnlineSurveys®. Categorical data were descriptively compared between the two rounds of data collection by ranking the responses at each time point, then calculating the rank change (rank in Round 1 minus rank in Round 2). Data from open-ended (free-text) questions were analysed using autonomous qualitative counting,[26] with responses grouped together based on their similarity, then counted.

## Results

### *Participant characteristics*

For this survey, there were two rounds of data collection with an equal number of 101 respondents per round, with all respondents answering all questions. Characteristics

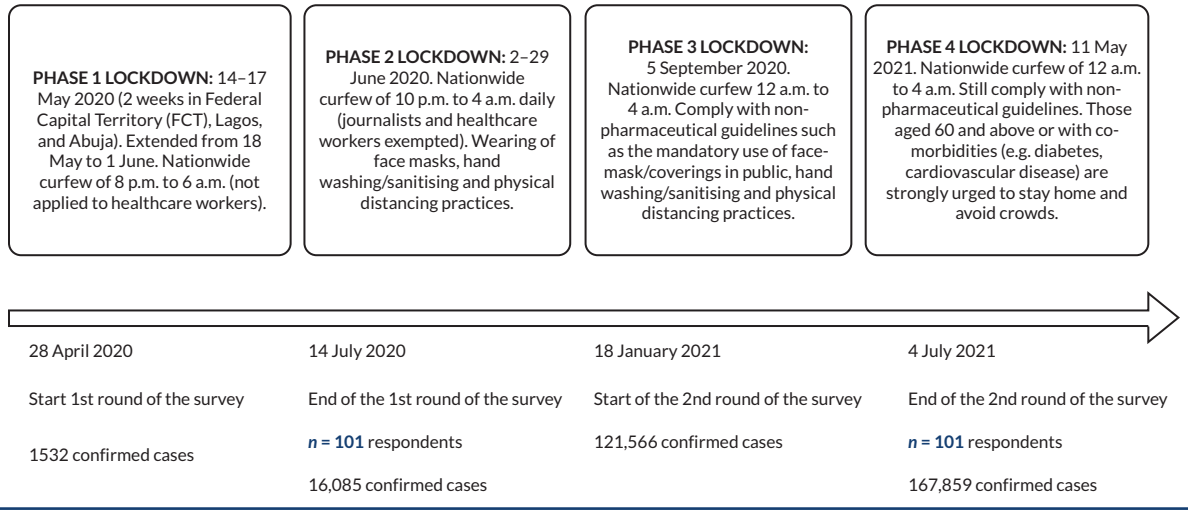


**FIGURE 1** Timeline for rounds of data collection and lockdown phases in Nigeria.

of the samples are presented in *Table 1*. The proportion of males and females in each of the rounds was similar (e.g. 57% male in Round 1 vs. 47% male in Round 2). The majority of HCWs were aged between 18 and 29 years in both rounds (54% and 49%, respectively) and were predominantly physiotherapists (55% and 50%, respectively), general practitioners (GPs) of modern medicine (12% and 10%, respectively) or nurses (8% and 10%, respectively). For both rounds of data collection, around 40% of HCWs were not involved in COVID-19 patient care; 30% of the respondents were involved in inpatient mobility assessments, and 26% were carrying out inpatient treatment.

**TABLE 1** Comparison of participant characteristics

| Variables | Round 1 | Round 2 |
|---|---|---|
| Participants (*n*) | 101 | 101 |
| Females, *n* (%) | 43 (43) | 54 (53) |
| Age, *n* (%) | | |
| 18–29 | 55 (54) | 49 (49) |
| 30–39 | 37 (37) | 44 (44) |
| 40–49 | 6 (6) | 4 (4) |
| 50–59 | 2 (2) | 3 (3) |
| 60–69 | 1 (1) | 1 (1) |
| Occupation, *n* (%) | | |
| Physiotherapist | 56 (55) | 50 (50) |
| General practitioner of Modern Medicine | 12 (12) | 9 (9) |
| Nurse | 8 (8) | 10 (10) |
| Occupational therapist | 6 (6) | 6 (6) |
| Surgeon | 4 (4) | 3 (3) |
| Pharmacist | 4 (4) | 4 (4) |
| Primary care practitioner | 2 (2) | 2 (2) |
| Public health practitioner | 2 (2) | 2 (2) |
| Other | 7 (7) | 14 (14) |
| Responsibilities for COVID-19 patients, *n* (%) | | |
| Not involved in COVID-19 care | 42 (42) | 37 (37) |
| Mobility assessment and exercises | 35 (35) | 25 (25) |
| Inpatient treatment | 27 (27) | 24 (24) |
| Outpatient clinics | 19 (19) | 23 (23) |
| Primary care and regular follow-up | 17 (17) | 9 (9) |
| Non-urgent care | 8 (8) | 7 (7) |
| Ongoing management | 6 (6) | 13 (13) |
| Diagnosis | 6 (6) | 4 (4) |
| Management of quarantine centres | 6 (6) | 2 (2) |
| Household/community sentinel surveillance | 5 (5) | 1 (1) |
| Oxygen therapy | 5 (5) | 4 (4) |
| Urgent assessments | 5 (5) | 6 (6) |
| Other | 13 (13) | 28 (28) |

**Note**
Other occupations: medical laboratory scientist, dentist, internal medicine physician, public speaker, health information manager, audiologist and speech language pathologist, prosthetist and orthotist, veterinarian, acute medicine specialist (Round 1: 1%, Round 2: 0), paediatrician (Round 1: 1%, Round 2: 2%), radiologist (Round 1: 0, Round 2: 1%), psychologist (Round 1: 0, Round 2: 2%), psychiatrist (Round 1: 0, Round 2: 3%), and general practitioner of alternative/traditional medicine (Round 1: 0, Round 2: 1%).
Other responsibilities for COVID-19 patients: research, psychosocial rehabilitation and fostering return to independence, standby for intervention, peri-operative care, speech management, pharmaceutical care, respiratory care, public health awareness and enlightenment, neonatal care, admission prevention (Round 1: 4%, Round 2: 7%), administrative work (Round 1: 2%, Round 2: 3%), medication checks (Round 1: 2%, Round 2: 5%), biological sample/collection/processing/analysis (Round 1: 1%, Round 2: 0), prescribing (Round 1: 0, Round 2: 5%).

### *Priority topics for post-COVID-19 support*

Survey respondents in Round 1 reported coping with stigma (72%), followed by aerobic exercise/regaining fitness levels (71%), integrating back into the community (66%), support for post-traumatic stress disorder (PTSD) (64%), and advice on nutrition (64%) as most important areas for post-COVID-19 patient support (*Table 2*). A similar response was observed for aerobic exercise/regaining fitness levels in Round 2 (67%). However, respondents in Round 2 reported advice on nutrition (71%) and coping with social isolation (68%) as the main focuses for support.

### *Structure of post-COVID-19 support*

In both rounds, 88% of the HCWs reported the need to support COVID-19 patients who had not been previously hospitalised. Additionally, over 63% of HCWs reported the individual's home as the most appropriate location to deliver the support. The majority of HCWs reported the ideal timing for post-COVID-19 support to be while managing symptoms at home or in the community (57% in Round 1 and 70% in Round 2), immediately after returning home from hospital (57% and 58%, respectively) and while in hospital (56% and 58%, respectively) (see *Report Supplementary Material 2, Table 1*).

**TABLE 2** Potential considerations for post-COVID-19 support

| | Round 1 data, % | Round 2 data, % | Change, % | Rank change |
|---|---|---|---|---|
| Coping with stigma of COVID-19 infection | 72 | 63 | −9 | −3 |
| Aerobic exercise/regaining fitness levels | 71 | 67 | −4 | −1 |
| Integrating back into the community | 66 | 60 | −6 | −2 |
| Support for PTSD | 64 | 56 | −8 | −4 |
| Advice on nutrition | 64 | 71 | +7 | +3 |
| Support for anxiety or depression | 62 | 54 | −8 | −4 |
| Coping with social isolation | 59 | 68 | +9 | +5 |
| Behaviour change relating to hygiene practice | 58 | 53 | −5 | −3 |
| Advice on medications | 56 | 60 | +4 | +4 |
| Advice on returning to work | 56 | 60 | +4 | +4 |
| Resistance exercise/strength training | 56 | 53 | −3 | −2 |
| Advice on managing fatigue | 53 | 55 | +2 | +3 |
| Advice on managing breathlessness | 53 | 60 | +7 | +7 |
| Infection control relating to COVID-19 | 51 | 52 | +1 | +1 |
| Monitoring symptoms | 50 | 51 | +1 | +1 |
| Lung function testing | 50 | 46 | −4 | −1 |
| Dealing with comorbidities | 50 | 51 | +1 | +1 |
| Advice on managing cough | 50 | 50 | 0 | 0 |
| Learning how to find trustworthy information | 44 | 37 | −7 | 0 |
| Dealing with grief | 43 | 35 | −8 | 0 |
| Financial advice | 38 | 31 | −7 | 0 |
| Other | 1 | 3 | +2 | 0 |

**Note**
Other: Coping skills and diversional strategies, work simplification and energy conservation.

### *Appropriate methods of communication*

In both rounds, 74% of HCWs selected the telephone as the most suitable means of communication with COVID-19 survivors (*Table 3*). A dedicated smartphone application was chosen as an appropriate communication tool by more respondents in Round 2 than Round 1 (47% in Round 1 vs. 57% in Round 2). Home visits (53% vs. 37%) and face-to-face communication (47% vs. 35%) were selected as appropriate communication strategies by fewer respondents in Round 2.

### *Barriers to referring patients for post-COVID-19 support*

Barriers to HCWs referring patients for post-COVID-19 support are presented in *Table 4*. In both rounds, inadequate supply of personal protective equipment (PPE) kits was reported as the greatest barrier (68% and 58%, respectively). In Round 1, stigma experienced by the patient was the second most reported barrier to patient referral (51%). Conversely, in Round 2, the cost of treatment was the second most selected barrier to post-COVID-19 referral (57%). The risk of patients being re-infected was the third-ranked barrier in both rounds (50% and 47%, respectively).

### *Healthcare worker-perceived patient barriers to accepting post-COVID-19 support*

According to the HCWs, stigma experienced by patients (65% in Round 1 and 60% in Round 2, respectively), cost of treatment (59% and 69%, respectively) and risk of patients

**TABLE 3** Communication strategies for post-COVID-19 support

| | Round 1 data, % | Round 2 data, % | Change, % | Rank change |
|---|---|---|---|---|
| Telephone calls | 74 | 74 | 0 | 0 |
| Video consultations | 61 | 53 | −8 | −1 |
| Home visits | 53 | 37 | −16 | −5 |
| Face-to-face | 47 | 35 | −12 | −5 |
| Dedicated smartphone app | 47 | 57 | +10 | +2 |
| Website/online platform | 46 | 41 | −5 | +1 |
| Text messaging | 44 | 42 | −2 | +3 |
| E-mail | 40 | 40 | 0 | +1 |
| Messaging app | 39 | 41 | +2 | +4 |
| Television | 39 | 32 | −7 | −1 |
| Radio | 37 | 28 | −9 | 0 |
| Newspaper | 26 | 21 | −5 | 0 |
| Paper-based instructions | 24 | 21 | −3 | +1 |

**TABLE 4** Barriers to HCWs referring patients for post-COVID19 support

| | Round 1 data, % | Round 2 data, % | Change, % | Rank change |
|---|---|---|---|---|
| Inadequate supply of PPE kits for healthcare professionals | 68 | 58 | −10 | 0 |
| Stigma experienced by patients | 51 | 44 | −7 | −2 |
| Risk of patient being re-infected | 50 | 47 | −3 | 0 |
| Lack of social support for the patient | 49 | 37 | −12 | −3 |
| Cost of treatment | 49 | 57 | +8 | +2 |
| No perceived need for support | 44 | 32 | −12 | −2 |
| Risk of patients infecting healthcare staff | 43 | 32 | −11 | −1 |
| Risk of patient spreading infection in the community | 42 | 41 | −1 | +3 |
| Patient employment/financial concerns | 34 | 41 | +7 | +4 |
| Belief in the value of non-medical treatments | 26 | 31 | +5 | 0 |
| Time commitment for healthcare professionals | 25 | 29 | +4 | 0 |
| Transport needs of patient | 24 | 22 | −2 | −3 |
| Uncertainty of non-medical treatments | 23 | 19 | −4 | −3 |
| Time commitment for patient | 19 | 23 | +4 | +1 |
| Patient's condition too poor to participate | 18 | 26 | +8 | +3 |
| Patient's condition too good to participate | 15 | 18 | +3 | −1 |
| Lack of time to make referrals | 15 | 14 | −1 | −2 |
| Patient living alone | 10 | 23 | +13 | +4 |
| Risks faced by patients when exercising | 9 | 10 | +1 | 0 |

being re-infected (56% and 49%, respectively) were the top three perceived barriers to patients accepting post-COVID-19 support in both rounds of the survey (see *Report Supplementary Material 2, Table 2*).

### *Factors that could encourage patients to take up post-COVID-19 support*

To mitigate the perceived patient barriers, HCWs advised awareness and health education programmes, availability of support systems and groups, and access to financial aid/incentives would be instrumental in encouraging patients to take up post-COVID-19 support.

## Discussion

This study presented the views of HCWs in Nigeria on ways to support individuals' recovery following SARS-CoV-2 infection. The findings suggest a provisional intervention to support people post COVID, in keeping with internationally recognised PR.[18,27,28] The intervention should be home-based, for hospitalised and non-hospitalised patients, with a combination of video and telephone support and dedicated smartphone application. It should focus on coping with the stigma of SARS-CoV-2 infection, aerobic exercise, integrating back into the community, support for PTSD and advice on nutrition. There is a need to address HCW-perceived patient barriers to accepting support, which include stigma, cost of treatment and risk of re-infection. Barriers to HCWs referring patients for such support included inadequate supplies of PPE.

The HCWs varied slightly in their top-ranked components for post-COVID-19 support between the two rounds of responses. Respondents in the first round selected aerobic exercise/regaining fitness levels, advice on returning to work and integrating back into the community as necessary considerations for interventions. The lockdowns and resulting movement restrictions at the time likely contributed to these preferences. In Round 2, advice on nutrition became the top-ranked consideration for post-COVID-19 support. The priority of nutrition was most likely derived from the need to strengthen the immune system,[29,30] in combination with strictly observing public health preventive methods to combat the virus as vaccination programmes in Nigeria lagged behind those in other parts of the world.[31] Of course, some individuals required minimal input (e.g. only online resources) to return to their daily routines.[32]

Healthcare workers perceived an urgent need to support COVID-19 survivors regardless of whether they were admitted to hospital, as the number of confirmed cases steadily increased beyond the capacity of the COVID-19 treatment centres across Nigeria. Hence, individuals who tested positive for the virus with few or no symptoms were advised to stay at home and not be transferred to designated facilities for effective care delivery. Although people hospitalised with COVID-19 would likely require rehabilitation, it is now clear that many non-hospitalised individuals also needed rehabilitation, supporting the views of HCWs in the present study.[33] Findings from this study are similar to those from an early survey conducted in the UK.[16] In both surveys (UK and Nigeria), exercise participation was viewed as being the main component of interventions, as well as a focus on supporting people to return to work.

The HCWs identified home or the community as the most ideal location for post-COVID-19 support while managing symptoms, supporting the notion of a flexible approach to delivering post-COVID support and highlighting a potential shift in location preferences in the pandemic context.[34] The culture and value system in a typical Nigerian setting is to show love, care, compassion and support, which may reduce the possible stigmatisation that patients were expected to experience. Given the stigma experienced by people with other infectious diseases, it is vital that efforts to tackle stigma associated with COVID-19 are at the forefront of interventions set up to support these individuals.[35,36] HCWs' preference for telephone communication with COVID-19 survivors seems feasible because smartphone devices are simple and easy to use, and readily available in Nigeria.

The proposed structure and priority topics for a post-COVID intervention align well with PR, as defined by international guidelines,[18,28] and are supported by studies of centre-based[22] and telerehabilitation trials[37] in the UK and China, respectively. However, PR is not readily available in LMICs generally,[19] and current guidelines are unlikely to be wholly applicable to low-resource settings,[38] including Nigeria, where a checklist for PR implementation has recently been developed.[39] This checklist may offer a suitable foundation, along with findings from the present study, to drive an increase in rehabilitation capacity in the country. For now, the additional challenge remains to develop such an intervention from the ground up. Efforts to develop PR in Africa are progressing,[34] with promising early evidence for the feasibility and effectiveness of PR in chronic respiratory disease (CRD) populations.[40]

Based on data from the UK, there may be an increase in demand for PR services by up to 25% due to those hospitalised with COVID-19.[41] The scale of the

rehabilitation needed for the existing CRD burden, combined with the addition of COVID-19, places a great burden on developing new services, especially in low-resource settings.

This survey study identified barriers to referring patients from the perspective of HCWs and the perceived barriers of patients accepting post-COVID-19 support. The analysis of these barriers showed inadequate supply of PPE, cost of treatment, risk of patient re-infection and patient stigmatisation were of primary concern. Prior to the pandemic, PPE was readily available, with a balance in its demand and supply chain in Nigeria. However, the pandemic placed a great demand on its availability, which led to severe PPE shortages.[42] Thus, it is understandable that concerns about PPE were noted. Regarding cost of treatment, not all patients infected with COVID-19 were admitted to the designated centres where they could access free care. These individuals paid for services, food and medication, often at great expense. Although the international community, private sector and individuals helped provide medical and food supplies,[43] the HCW respondents noted that the support was insufficient to cover the most populous nation in Africa. The risk of patient re-infection was also expressed as a barrier to post-COVID-19 support, aligned with previous work[44] and likely exacerbated by low vaccine availability.[45,46]

HCWs identified the need to encourage survivors to take up post-COVID-19 support with education and information provision, health promotion/public health and the need for financial support as the main suggestions. In practice, post-COVID-19 support is unlikely to have a high uptake in Nigeria unless it is available for free, is convenient and engages the local communities to provide additional support for those impacted by the virus. While there is early evidence that COVID rehabilitation (adapted from PR[33]) improves symptoms,[22] with larger definitive trials ongoing,[47] it is the ability of existing services to maintain this delivery when people with CRDs resume participation in PR that is a cause for concern.[22,48] Results from this survey support the need to develop rehabilitation systems in settings such as Nigeria, as well as LMICs more broadly, where PR is not readily available.[19,49]

### *Limitations*

This survey study was exploratory, with a convenience sample of HCWs recruited via online methods only. Therefore, selection biases related to social media use and internet access are likely to be present. The influence of the timing of responses in the context of COVID-19 was minimised by having two separate rounds of data collection (April–July 2020 and January–July 2021). The longer time frame needed for Round 2 highlights challenges with recruitment, driven mainly by experiences deeper into the pandemic. However, the different duration of the time frames should have a minimal impact on comparability. Recruitment of people living with post-COVID-19 symptoms was not possible due to staffing, resource and COVID restrictions, further exacerbated by limited access to the internet. Respondents were predominantly aged 18–34 years, which likely reflects social media usage. A third of participants were not directly involved in COVID-19 care, which may have limited their drawing on direct experiences, but nonetheless contributes to capturing a broad range of HCW perspectives. Further in-depth qualitative insights are needed to inform the development of suitable post-COVID rehabilitation, building on the present study findings.

In summary, the study provided information on ways to support people's recovery following SARS-CoV-2 infection in Nigeria from the perspective of HCWs. Based on two rounds of responses, it is recommended to address challenges for hospitalised and non-hospitalised patients with home or community-based interventions combining video and telephone support. Internationally recognised PR[18,27,28] is an appropriate intervention to modify for this population, and efforts should be made to increase its availability as a clinical service in Nigeria. The focus of future interventions should be on coping with the stigma of SARS-CoV-2 infection, aerobic exercise, integrating back into the community, support for PTSD and advice on nutrition. HCW-perceived patient barriers to taking up support interventions were inadequate supply of PPE, cost of treatment, risk of patient re-infection and stigmatisation, while HCW barriers to referring patients for such support focused mainly on inadequate PPE supplies. Survivors' education and information provision, targeting public health messages and financial support were noted as important factors to encourage survivors to engage in post-COVID-19 services. The findings of this study can be used to inform future work developing post-COVID rehabilitation in Nigeria.

## Additional information

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### *CRediT contribution statement*

**Ayobami Fasuba (https://orcid.org/0000-0002-2221-542X):** Data curation (lead), Formal analysis (lead), Investigation (lead), Methodology (equal), Project administration (equal), Visualisation

(lead), Writing – original draft (lead). **Ilaria Pina (https://orcid.org/0000-0002-6294-5398):** Formal analysis (supporting), Methodology (supporting), Supervision (supporting), Validation (supporting), Visualisation (supporting), Writing – original draft (supporting), Writing – editing and reviewing (supporting). **Zainab K Yusuf (https://orcid.org/0000-0001-7859-5102):** Formal analysis (supporting), Methodology (equal), Validation (equal), Writing – editing and reviewing (supporting). **Laura Wilde (https://orcid.org/0000-0002-1404-6304):** Formal analysis (supporting), Methodology (supporting), Validation (supporting), Writing – editing and reviewing (supporting). **Sally J Singh (https://orcid.org/0000-0002-9834-0366):** Conceptualisation (equal), Funding acquisition (lead), Methodology (equal), Project administration (equal), Writing – editing and reviewing (supporting). **Mark W Orme (https://orcid.org/0000-0003-4678-6574):** Conceptualisation (equal), Formal analysis (supporting), Funding acquisition (supporting), Methodology (equal), Project administration (equal), Supervision (lead), Validation (lead), Writing – original draft (supporting), Writing – editing and reviewing (lead).

## Disclosure of interests

***Full disclosure of interests:*** Completed ICMJE forms for all authors, including all related interests, are available in the toolkit on the NIHR Journals Library report publication page at https://doi.org/10.3310/UTNT4760.

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## Data-sharing statement

All data requests should be submitted to the corresponding author for consideration. Access to anonymised data may be granted following review.

## Ethics statement

Ethical approval was obtained from the University of Leicester (reference: 24736) on 21 April 2020.

## Information governance statement

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This article reports on one component of the research award Views of healthcare workers to help develop support for people with post-COVID syndrome in Nigeria: a survey study. For more information about this research please view the award page (www.fundingawards.nihr.ac.uk/award/17/63/20)

## About this article

The contractual start date for this research was in April 2018. This article began editorial review in June 2022 and was accepted for publication in January 2024. The authors have been wholly responsible for all data collection, analysis and interpretation, and for writing up their work. The Global Health Research editors and publisher have tried to ensure the accuracy of the authors' article and would like to thank the reviewers for their constructive comments on the draft document. However, they do not accept liability for damages or losses arising from material published in this article.

## Copyright

## List of abbreviations

| | |
|---|---|
| COVID | coronavirus disease |
| GP | general practitioner |
| HCWS | healthcare workers |
| LMICS | low- and middle-income countries |
| NIHR | National Institute for Health and Care Research |
| PPE | personal protective equipment |
| PR | pulmonary rehabilitation |
| PTSD | post-traumatic stress disorder |
| SARS-COV-2 | severe acute respiratory syndrome coronavirus-2 |
| STROBE | Strengthening the Reporting of Observational Studies in Epidemiology |

## List of supplementary material

The following supporting information can be downloaded on the NIHR Journals Library webpage (https://doi.org/10.3310/UTNT4760).

**Report Supplementary Material 1** Survey

**Report Supplementary Material 2** Supplementary tables

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