Research Article

Nigerian physiotherapists’ knowledge, current practice and perceptions of their role for promoting physical activity: A cross-sectional survey

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Abstract

Background

Nigeria has the highest rates of physical inactivity in Africa. As physical inactivity is a leading global risk factor for non-communicable diseases (NCD), physical activity promotion is a strategy for their mitigation. Physiotherapists are already ideally situated to undertake this role and can assist in the reversal of NCD. Gaining insight into how physiotherapists in Nigeria perceive their role in relation to physical activity promotion is needed to ensure this undertaking will be effective. This national survey aimed to investigate Nigerian physiotherapists’ knowledge and current practice for promoting physical activity across Nigeria and perceptions of their role related to this.

Methods

Following ethical approval, a cross-sectional, online questionnaire survey design was employed to investigate the aim. 330 qualified physiotherapists, working across Nigeria were recruited. Internal consistency of the survey was examined using Cronbach’s alpha. Descriptive statistics were used to analyse closed questions. Thematic content analysis was used to analyse open-ended questions. Chi-square inferential statistic was used to investigate the association between variables with alpha interpreted at a level of 0.05.

Results

The internal consistency of the questionnaire survey was good overall (Cronbach Alpha α = 0.71). 330 physiotherapists participated. 99.4% agreed that discussing the benefits of a physically active lifestyle with patients is part of their role. However, over 60% did not feel confident in suggesting specific physical activity programs for their patients. 59.7% were aware of one or more physical activity guideline. However, only 49.1% were incorporating it
into their practice. 85.5% felt that developing a physical activity guideline specifically for Nigeria would promote physical activity. 63.3% of respondents did not use any resource in promoting physical activity. An association was found between the physiotherapist’s awareness of physical activity guidelines and male sex ($\chi^2 = 8.95$, df = 2, p = 0.01).

**Conclusion**

Whilst most physiotherapists had a positive perception of their role in promoting physical activity, translating this into practice would seem to be challenging. A systems approach to physical activity health promotion is recommended with the need for a commitment by the Nigerian Government to the development and implementation of national guidelines. Incorporating more training in physiotherapy education could foster more confidence in the delivery of these guidelines. Greater use of resources and working with community organisations could help to optimise physical activity uptake in Nigeria.

**Background**

Physical inactivity is one of the leading global risk factors for non-communicable diseases (NCD) such as cardiovascular disease, cancer and diabetes as well as death [1, 2]. Conversely, engaging in regular physical activity besides prevention can also be effective in the treatment of NCD [3] and help to improve quality of life and mental wellbeing [4]. Physical inactivity globally is estimated to cost approximately US$ 54 billion per year in direct health care costs with an additional US$ 14 billion attributable to lost productivity [5]. Although disease burden is claimed to be more of a concern for low and middle income countries, with less national revenue per capita, the financial strain can also be considerable [6].

Worldwide, 1 in 4 adults [7], and three quarters of adolescents do not meet the global recommendations for physical activity [8]. In sub-Saharan African, the World Health Organization (WHO) have estimated there are around three million deaths related to physical inactivity [9]. African countries, including Nigeria, bear a disproportionately higher burden of these deaths. This is linked to increased urbanization and economic growth, with a consequent increase in unhealthy lifestyles and sedentary behaviour [10, 11]. Nigeria, with over 200 million citizens has the largest population in Africa [12]. It is estimated that 50 million of its population are not engaging in sufficient weekly physical activity, and as such, Nigeria has the highest rates of physical inactivity on the continent [12]. Furthermore, one quarter of all male and one third of female deaths in Nigeria have been attributed to NCD [13].

Increasing physical activity is a recommended strategy for controlling NCD [3]. As such, as part of the Global Action Plan for the prevention and control of NCD, WHO member states have agreed a 10% reduction in the prevalence of insufficient physical activity by 2025 as one of the nine global targets to improve the prevention and treatment of NCD [14]. However, it has been reported that progress in achieving this has been slow and off target [7, 12], therefore more needs to be done to promote physical activity.

Physiotherapists as experts in movement and exercise, especially in the management of NCDs, are already ideally situated to undertake this role and therefore have a pivotal position in promoting and managing physical activity [15]. As the health professionals with expertise in prescribing exercise for health, physiotherapists can assist in the reversal of NCD and significantly contribute to reducing their global burden [16].
Whilst physiotherapists may be well placed to promote physical activity, gaining more insight into how physiotherapists perceive their role in relation to this is needed to ensure this strategy will be effective. However, the perception of the physiotherapist’s role and practice towards physical activity promotion in Nigeria has not been fully investigated. Studies in this area from Western, high-income countries (for example, Lowe et al. [17]; Freene et al. [18]) may not be applicable to low- and low-middle income African countries such as Nigeria. Moreover, there is limited research on this issue in Nigeria, with the studies undertaken in specific regions and states [19–22], which may not capture the diversity that exists across the country. Currently, no national study has been undertaken that has investigated the perceptions, knowledge, and current practice of the physiotherapist’s role of the physiotherapist in Nigeria in relation to physical activity promotion. By gaining an understanding of Nigerian physiotherapists’ knowledge and current practice nationally, recommendations can be made to enable physiotherapists to enhance their role as promoters of physical activity and assist Nigeria in meeting its global commitments to reducing NCD [23]. Therefore, this national survey aimed to investigate Nigerian physiotherapists’ knowledge and current practice for promoting physical activity across Nigeria and perceptions of their role related to this.

Methods

Ethics

Ethical approval was granted from Bayero University’s College of Health Sciences, Kano, Nigeria, ethics committee (reference: BUK/CHS/HREC/132).

Study design

A cross-sectional, questionnaire survey design was employed to explore physiotherapists’ perceptions, knowledge, and current practice methods for promoting physical activity in Nigeria. STROBE reporting guidelines for observational studies was used to report the study [24].

Participants

Participants were eligible to take part if they were qualified physiotherapists, working in a private or government-based institution, in any speciality, in Nigeria. Nigeria is made up of 36 states and its Federal Capital Territory, Abuja. The states are grouped into six geopolitical zones (North-east, North-west, North-central, South-west, South-east, South-south), each having different cultural traditions and religious beliefs. To detect a change in the proportion of responses between variables in this study using Chi Squared, an estimated sample of 101 and 137 was required to ensure an alpha of 0.05 with a power of at least 0.80 using G*Power [25]. The estimated sample size was based on an effect size (w = 0.24 and 0.28) derived from questions related to promoting physical activity in a similar study by Aweto [20]. As not all data was statistically analysed, we also considered the degree of confidence in responses using an online tool with 95% confidence intervals, a 5% margin of error and based on a 63.3% population reach [20]; the estimated sample for this aspect of the study was 330.

Procedure

The survey tool was developed using Google Forms software. The questionnaire was presented in two sections (S1 Appendix). The first section was adapted from a previous questionnaire used to investigate the promotion of physical activity by physical therapists in Australia [26]. It was modified to make it culturally appropriate to Nigeria. This section investigated the following topics: perceptions of the role of physiotherapy in promoting physical activity, knowledge
of physical activity guidelines, current practice of physical activity promotion and the perceived barriers and facilitators to this. Most questions were closed with finite choice answers. The second section obtained participants’ socio-demographic information.

The questionnaire survey was pretested by the research team (GY, SH) to ensure the functionality of the online survey. It was then piloted on five specialist physiotherapists involved in health promotion across Nigeria [27]. Their specialities included orthopaedic & sports physiotherapy, neuro-physiotherapy, women’s health physiotherapy, community health & ergonomics physiotherapy, and cardiorespiratory physiotherapy. The physiotherapists included three females and two males with an average age of 38 years and a mean working experience of seven years. The testers agreed that the questionnaire was acceptable and straightforward to use, and they offered suggestions for improvement. They proposed that some parts of the questionnaire be omitted as these were not relevant to physiotherapy in Nigeria and certain questions should be reworded to be more specific to the Nigerian context. Following re-piloting, only minor changes were made in response to feedback about the consistency of wording in some questions. The internal consistency was also checked using a sample of 18 Nigerian physiotherapists who were purposively sampled to reflect a range of genders, work speciality and years of practice experience.

The survey was live between October 2020 to February 2021. The link to the survey was distributed using purposive sampling via the Nigeria Society of Physiotherapy (NSP), WhatsApp groups, and other professional physiotherapy social media networks for each state and region across Nigeria. Snowball sampling was then used whereby respondents were requested to forward the survey link to their physiotherapy colleagues. Reminders were sent every 2 weeks during the period the survey was live to ensure maximum response until the a priori sample size was achieved.

Data analysis

Before distributing the questionnaire to potential participants, internal consistency was measured using Cronbach’s alpha. Cronbach’s alpha gives scores ranging from 0 to 1, with high alpha values indicating a high degree of interrelatedness among items and values between 0.70–0.95 are considered good [28]. Once assessed, data were collected through Google Forms online survey. The responses were exported to Excel (Microsoft) and transferred to Statistical Packages for the Social Sciences (version 25, IBM SPSS< Armonk, NY) for analysis. Descriptive statistics were used to present the demographic data and to summarize the closed questions, which were presented using percentages and frequency distributions. Chi-square inferential statistic was used to investigate the association between physiotherapists’ socio-demographic variables and promoting physical activity, with alpha interpreted at a level of 0.05. Thematic content analysis was used to analyse open-ended questions, and the results were interpreted in a narrative format.

Results

The internal consistency of the questionnaire survey ranged from moderate to excellent (Cronbach Alpha $\alpha = 0.6$ to 1.0) for sub-domains and $\alpha = 0.71$ for the entire instrument indicating good international consistency overall. All returned questionnaires were analysed. The lead author (BB) was responsible for data processing and management. As the online survey did not allow a respondent to move to the next question until previous sections were completed, all compulsory questions were answered by all respondents. Some questions included an optional open text box to add comments (S1 Appendix), this was not used by all respondents, therefore, total response rates for these optional open text questions vary. Three
hundred and thirty (330) physiotherapists participated in this study. The participants’ ages ranged from 20 to 63 years, with a mean age of 35.4 (SD 8.05) years (Table 1). The majority of the respondents (n = 100, 30.3%) were from North-west Nigeria, with a similar percentage

Table 1. Sociodemographic characteristics of participants.

| Sociodemographic characteristics n = 330 | No. of respondents (%) |
|-----------------------------------------|------------------------|
| **Age (Years)**                         |                        |
| 20–29                                   | 91 (27.6)              |
| 30–39                                   | 137 (41.5)             |
| 40–49                                   | 79 (23.9)              |
| 50–59                                   | 22 (6.7)               |
| ≥60                                     | 1 (0.3)                |
| **Gender**                              |                        |
| Male                                    | 193 (58.5)             |
| Female                                  | 137 (41.5)             |
| **Years of practice**                   |                        |
| < 5                                     | 93 (28.2)              |
| 5–9                                     | 92 (27.9)              |
| 10–15                                   | 75 (22.7)              |
| 16–20                                   | 35 (10.6)              |
| 21–25                                   | 19 (5.8)               |
| 26–30                                   | 11 (3.3)               |
| ≥30                                     | 5 (1.5)                |
| **Highest qualification**               |                        |
| Bachelor’s                              | 162 (49.1)             |
| Masters                                 | 131 (39.7)             |
| PhD                                     | 28 (8.5)               |
| DPT                                     | 9 (2.7)                |
| **Work setting**                        |                        |
| Government hospital                     | 243 (73.6)             |
| University                              | 43 (13.0)              |
| Private practice                        | 35 (10.6)              |
| Sports centers                          | 9 (2.8)                |
| **Work Specialty**                      |                        |
| Orthopedic & Manual Therapy             | 118 (35.9)             |
| Cardiopulmonary                         | 26 (7.6)               |
| Neurophysiotherapy                      | 50 (15.2)              |
| Paediatric physiotherapy                | 31 (9.5)               |
| Sports physiotherapy                    | 9 (2.7)                |
| Geriatric physiotherapy                 | 7 (2.1)                |
| Women’s health                          | 8 (2.4)                |
| General physiotherapy                   | 81 (24.6)              |
| **Work region**                         |                        |
| North-east                              | 36 (10.9)              |
| North-west                              | 100 (30.3)             |
| North-central                           | 51 (15.5)              |
| South-west                              | 49 (14.8)              |
| South-east                              | 51 (15.5)              |
| South-south                             | 43 (13.0)              |

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responding from North-central, South-east and South-west Nigeria. The North-east had the fewest respondents \((n = 36, 10.9\%)\). Most respondents were male \((58.9\%)\), had an entry-level bachelor’s degree \((49.1\%)\), mainly worked in a government hospital setting \((73.6\%)\), and had nine or fewer years of practice experience \((56.1\%)\), with most \((36.5\%)\) working in the orthopaedic and manual therapy specialty.

Almost all the respondents \((99.4\%)\) agreed that discussing the benefits of a physically active lifestyle with patients is a part of a physiotherapist’s role and that they should be physically active to serve as role models for their patients \(\text{(Table 2)}\). However, over 60\% of respondents did not feel confident in suggesting specific physical activity programs for their patients.

Sixty percent of respondents said that they were aware of one or more physical activity guidelines \(\text{(Table 3)}\). However, only 49.1\% of the respondents were incorporating it into their practice. The most common physical activity guidelines known and used by the respondents were the WHO physical activity guidelines and the American College of Sports Medicine Guidelines (ACSM).

The majority of the respondents \((85.5\%)\) felt that developing a physical activity guideline specifically for Nigeria would promote physical activity in Nigeria \(\text{(Fig 1)}\). Analysis of the open

### Table 2. Perception and confidence statements of respondents.

| Statement                                                                 | n  | Strongly agree | Agree | Undecided | Disagree | Strongly disagree |
|---------------------------------------------------------------------------|----|----------------|-------|-----------|-----------|------------------|
| Discussing the benefits of a physically active lifestyle with patients is a part of a physiotherapist’s role | 330 | 269 (81.5\%) | 59 (17.9\%) | - | 1 (0.3\%) | 1 (0.3\%) |
| Discussing how patients can increase their physical activity levels is a part of a physiotherapist’s role | 330 | 252 (76.4\%) | 76 (23\%) | 2 (0.6\%) | - | - |
| Physiotherapists should promote physical activity in every contact they have with their patient | 330 | 169 (51.2\%) | 144 (43.6\%) | 8 (2.4\%) | 9 (2.7\%) | - |
| Physiotherapists should be physically active to act as a role model for their patients | 330 | 225 (68.2\%) | 95 (28.8\%) | 7 (2.1\%) | 3 (0.9\%) | - |
| I feel confident in giving general advice to patients on living a physically active lifestyle | 330 | 221 (67\%) | 101 (30.6\%) | 8 (2.4\%) | - | - |
| I feel confident in suggesting specific physical activity programs for my patients | 330 | 106 (32.1\%) | 7 (2.1\%) | 16 (4.8\%) | 46 (13.9\%) | 155 (47\%) |

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### Table 3. Knowledge and current practice statements of respondents.

| Statement                                                                 | n  | YES | NO | MAYBE |
|---------------------------------------------------------------------------|----|-----|----|-------|
| Are you aware of any of the physical activity guidelines?                | 330 | 197 (59.7\%) | 70 (21.2\%) | 63 (19.1\%) |
| Do you use any of these guidelines?                                      | 330 | 162 (49.1\%) | 103 (31.2\%) | 65 (19.7\%) |
| I recommend physical activity if a patient’s health condition demands it | 330 | 254 (77\%) | 71 (21.5) | 5 (1.5\%) |
| I recommend physical activity even to a healthy person to keep an active lifestyle | 330 | 254 (77\%) | 5 (1.5\%) | 71 (21.5\%) |
| I initiate conversations about physical activity with all my patients    | 330 | 207 (62.7\%) | 7 (2.1\%) | 116 (35.2\%) |
| I assess my patient’s physical activity status irrespective of their health needs | 330 | 120 (36.4\%) | 16 (4.8\%) | 194 (58.8\%) |
| As part of your undergraduate physiotherapy course did you learn about promoting physical activity for health | 330 | 232 (70.3\%) | 84 (25.5\%) | 14 (4.2\%) |

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text comments revealed that participants’ most typical reasons for this were that it would be: more culturally specific ‘Developing guidelines that fit our environment, culture and socio-economic status will improve engagement’; lead to better client outcomes ‘It might increase the level of health status of many Nigerians and hence help in reducing hospitalization thereby reducing the cost of living’; promote compliance and removal of barriers ‘This will help in removing barriers such as language, culture as well as religion’.

Most respondents (58.8–86.7%) felt that the key recommendations when promoting physical activity were: undertaking muscle strengthening, balance and flexibility exercises, achieving 150 mins/week of physical activity, and minimizing long sitting periods per day (Fig 2).

The most common potential barriers stated by respondents for people not being physically active included lack of time, security, religious and economic issues, perception of ‘being fine or healthy’ and thus did not need it (Fig 3).

Analysis of the open text comments regarding the barriers to being more physical activity revealed n = 270 of the respondents felt that education of the general population was needed to increase their knowledge of the benefits of physical activity ‘Creating more awareness by health practitioners to make people understand that it’s the cheapest medicine in managing and
preventing diseases’. Additional factors mentioned were: enhancing security and environmental factors, ‘Improved security for the average Nigerian will help a lot’; Accessibility and affordability, ‘Walkways and sporting centres should be made more accessible and affordable’; cultural factors ‘Engaging opinion leaders such as religious and traditional leaders on the need to encourage their followers on the benefits of engaging in physical activity’, and lifestyle modifications ‘Incorporate it in workplace’.

Surprisingly, 63.3% of respondents do not use any resource in promoting physical activity, rather used conversation alone (Fig 4). ‘Other’ resources (3.9%) that respondents highlighted were verbal explanations and practical demonstrations.

An association was found between the physiotherapist’s awareness of physical activity guidelines and male sex ($\chi^2 = 8.95, df = 2, p = 0.01$). However, no associations were found between promoting physical activity and region; learning about physical activity promotion as an undergraduate; and area of work (all $p > 0.05$).

**Discussion**

Physiotherapists in our study had a positive disposition towards physical activity promotion with almost all agreeing that discussing the benefits of a physically active lifestyle with patients...
is a part of a physiotherapist’s role. However, approximately 40% claimed they were not aware or were uncertain about specific physical activity guidelines, and fewer than 50% used any physical activity guidelines in their current practice. This reflects previous research findings in Northern Nigeria [22] and other countries [17, 29, 30], which have demonstrated physiotherapists’ willingness to promote physical activity, even though many lacked knowledge of physical activity guidelines. For those who were familiar with the guidelines, the WHO and the ACSM guidelines were the most commonly known and used. The WHO guidelines have been developed for use in high, middle and low-income countries and are promoted globally to reduce sedentary behaviour in various populations [23]. It is likely that this is why these were one of the most well-known among the physiotherapists in our study. Although including information appropriate to low and lower-middle income countries such as Nigeria improves the WHO guidelines relevancy, tailoring these specifically to their population’s needs would enhance their applicability further.

Indeed, appropriateness of guidelines was clearly a concern for physiotherapists in our study as the majority of respondents (85.5%) acknowledged that developing physical activity guidelines specifically for Nigeria would help promote physical activity. Highlighting the need for Nigerian physical activity guidelines is consistent with previous research to enhance physical activity promotion in this country [20]. Respondents in our study, suggested that developing more culturally specific guidelines tailored to Nigeria could help address barriers such as those due to language, culture and religion, thereby promoting compliance and thus leading to better client outcomes in this population. In fact, the 2015 Nigerian National Strategic Plan of Action on NCD proposed the development and implementation of national guidelines on physical activity for health [31], however; these have not yet come into fruition. As a Member State of the United Nations (UN), Nigeria has adopted the 2030 Agenda for Sustainability Development [32]. Core to this, are the 17 Sustainable Development Goals (SDG), with Goal 3 being ‘to ensure healthy lives and promote well-being for all at all ages’ [32]. A review in 2020 on the progress Nigeria has made towards these goals has emphasised that more government investment in public health and delivery of national initiatives is required [33]. As such, more commitment from the government to address determinants of health such as physical inactivity is urgently needed, as it will help it meet its SDG targets [32].

In our study, whilst most felt confident in providing general advice on living a physically active lifestyle, the majority of physiotherapists did not feel confident in suggesting specific physical activity programmes for their clients. This resonates with earlier findings particular to Nigeria [20]. Undergraduate and postgraduate curricula in relation to health promotion in Nigeria has previously been highlighted as inadequate [34]. Therefore, the lack of confidence in implementing specific physical activity programmes into routine clinical practice may be related to lack of training and continuing education of physiotherapists in physical activity promotion. Incorporating more physical activity training within the physiotherapy profession in Nigeria could consequently, foster more self-assurance in the delivery of specific physical activity programs and help to optimise physical activity promotion for health improvement [35]. However, to amplify the public health message and help to facilitate a change in practice, national backing is also required [36]. For example, in the United Kingdom (UK), ‘Making Every Contact Count’ and ‘Moving Medicine’ are both government-endorsed initiatives that guide, support and champion health professions in promoting health behaviour change, such as being physically active, to improve people’s health and wellbeing [35, 37]. Both enterprises provide toolkits and other evidence-based resources to facilitate transference into practice by health professionals during routine conversations with their clients [37, 38]. Educational resources are also provided to foster the embedment of health promotion into health professionals' undergraduate and postgraduate training [35]. Creating national campaigns in Nigeria
such as these, and developing effective communication channels to promote awareness of, and access to, resources by physiotherapists could help to address the lack of confidence reported by some in our study.

The most common barriers to physical activity highlighted by the physiotherapists in our study included time, security, religion and economic factors. Wider influences such as socio-economic, cultural and environmental conditions are known determinants of physical activity and sedentary behaviours \[39, 40\]. These are particularly important factors in a country such as Nigeria where 40% of the population, which equates to over 82.9 million Nigerians, are deemed to be living in poverty \[41\]. Furthermore, there are large inequalities in education attainment and healthcare access \[42, 43\], and substantial regional variation, with higher rates of poverty in the North-west region of Nigeria \[44\]. Interestingly, no association was found between promoting physical activity and region in our study. This may suggest that factors to promoting physical activity promotion are more complex and nuanced. Previous studies have shown that effective physical activity promotion requires implementing culturally sensitive, multi-component interventions that make it easier for people to stay active \[45, 46\]. Recognising the diverse influences on physical activity promotion, through a systems approach, whereby both national and community campaigns across multi-sectors are utilized, would therefore seem essential \[12, 47\]. This is also more likely to foster collective advocacy for policy implementation as well as develop local tailored interventions that support community socio-economic, environmental and cultural needs \[47, 48\]. For example, the African Physical Activity Network, which includes stakeholders from private, public and the third sector \[49\], are ideally placed to drive physical activity initiatives across the country. However, more support and investment from national government would help to optimise the opportunities they could offer.

In our study, as elsewhere \[29\], most physiotherapists did not use any resources in promoting physical activity and preferred to do this through conversation alone. Physical activity promotion through patient education could provide a cost-effective intervention, particularly for managing people with chronic conditions \[50\]. However, translating physical activity promotional messages into practice have been found to be challenging \[51, 52\]. Therefore, incorporating other means to aid conversations could optimise its effectiveness. Of the physiotherapists in our study, 18.8% used online resources and only 4.5% used leaflets. Including visual aids, such as infographics of the physical activity guidelines, could help to facilitate physical activity promotion to patients, as well as support health professionals in providing appropriate information \[52\].

Evidence has also highlighted the benefits of technology for enhancing physical activity promotion including smartphone apps and activity trackers \[53, 54\]. However, in our study, apps were the least favoured resource used. The utilisation of technology could lead to widening inequities for those who lack digital literacy or the financial means to access these resources \[55\]. Nevertheless, internet and smartphone use amongst the Nigerian population is continuing to grow \[56\]. Therefore, more use of technology and apps could offer further opportunities to support physical activity promotion. Moreover, providing apps that are free and can be tailored to individual needs should be considered to improve inclusivity \[57\].

In our study only 6.7% of physiotherapists directed people to other services, such as community groups. Working with community organisations that are embedded locally and hence offer more insight into their population’s needs, could foster more effective ways to optimise physical activity promotional campaigns \[58\]. Previous research has also highlighted the potential of community health workers undertaking public health promotion in Africa \[59\]. Physiotherapists could also collaborate with health workers to endorse physical activity within their locality. Furthermore, it has be found that facilitating communities to take ownership of
the health initiatives delivered in their area improves safe access to services and helps to build trust with health care organisations [23].

It is reassuring that our study found that most physiotherapists perceived they should be physically active to serve as role models for their patients. Previous research has found that patients may be more motivated to change their health behaviour if the health professional is seen as a role model in that behaviour [60, 61]. Therefore, it is important that physiotherapists are aware of the impact that role modelling has on client’s uptake of physical activity. Designing workplace initiatives that foster healthcare workers engagement in healthy behaviours, including physical activity, would not only facilitate physiotherapists’ ability to become role models but also enhance their health and hence the population health of Nigeria [62].

Strengths and limitations
This is the first national survey to investigate Nigerian physiotherapists’ knowledge and current practice for promoting physical activity across Nigeria and perceptions of their role related to this. The survey was found to have good international consistency overall. However, this study has some limitations. The majority of respondents (30%) were from the North-west zone. This may be due to the primary researcher working and residing in the location, which may have increased colleagues from that region to participate in the study. This may indicate selection bias in the geopolitical zones with the highest number of participants. In addition, social desirability bias could lead respondents to answer the questions as perceived appropriate. However, as the survey was anonymous this may have helped mitigate this. The online format could also allow physiotherapists to search online before responding to certain questions such as for the questions around knowledge of physical activity guidelines. However, the lack of knowledge around physical activity guidelines may suggest this was not the case. Finally, whilst male sex was found to be significantly associated with physiotherapist’s knowledge of physical activity guidelines, this may be due to the majority of respondents surveyed being male, rather than males having a greater knowledge of the guidelines.

Conclusion
This study found that physiotherapists in Nigeria had a positive perception of their role in promoting physical activity among people in Nigeria. However, translating physical activity promotion into practice would seem to be challenging. Incorporating more training in physiotherapy education could foster more confidence in the delivery of these guidelines. The use of technology, visual aids, including infographics of guidelines and working with community organisations could help tailor promotional campaigns to the population’s needs to optimise physical activity uptake in Nigeria. Finally, a systems approach to physical activity health promotion that includes both national and community campaigns across multi-sectors is recommended.

Supporting information
S1 Appendix. Questionnaire survey.
(DOCX)

Author Contributions

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References

1. Katzmarzyk PT, Friedenreich C, Shiroma EJ, Lee IM. Physical inactivity and non-communicable disease burden in low-income, middle-income and high-income countries. British Journal of Sports Medicine. 2021 Mar 2. https://doi.org/10.1136/bjsports-2020-103640 PMID: 33782046

2. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT, Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. The Lancet. 2012 Jul 21; 380(9838):219–29. https://doi.org/10.1016/S0140-6736(12)61031-9 PMID: 22818936

3. World Health Organization. Best buys’ and other recommended interventions for the prevention and control of noncommunicable diseases. Geneva: World Health Organization. 2017.

4. Schuch FB, Vancampfort D, Richards J, Rosenbaum S, Ward PB, Stubbs B. Exercise as a treatment for depression: a meta-analysis adjusting for publication bias. Journal of psychiatric research. 2016 Jun 1; 77:42–51. https://doi.org/10.1016/j.jpsychires.2016.02.023 PMID: 26978184

5. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, Van Mechelen W, et al., Lancet Physical Activity Series 2 Executive Committee. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. The Lancet. 2016 Sep 24; 388(10051):1311–24. https://doi.org/10.1016/S0140-6736(16)30383-X PMID: 27475266

6. Ranasinghe C, Ozemek C, Arena R. Exercise and well-being during COVID 19–time to boost your immunity. Expert review of anti-infective therapy. 2020 Dec 1; 18(12):1195–200. https://doi.org/10.1080/14787210.2020.1794818 PMID: 32662717

7. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. The lancet global health. 2018 Oct 1; 6(10):e1077–86. https://doi.org/10.1016/S2214-109X(18)30357-7 PMID: 30193830

8. Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1·6 million participants. The Lancet Child & Adolescent Health. 2020 Jan 1; 4(1):23–38.

9. World Health Organization. Global status report on noncommunicable diseases 2014. World Health Organization; 2014.

10. Chigbu CO, Berger U, Aniebue U, Parhofer KG. Physical activity and outdoor leisure time physical exercise: A population study of correlates and hindrances in a resource-constrained African setting. Journal of Multidisciplinary Healthcare. 2020; 13:1791. https://doi.org/10.2147/JMDH.S3293822 PMID: 33293822

11. World Health Organization. WHO Global Strategy on Diet, Physical Activity and Health: African Regional Consultation Meeting Report. Geneva, Switzerland: World Health Organization; 2003.

12. Adeloye D, Ige-Elegbede JO, Auta A, Ale BM, Ezeigwe N, Omoyle C, et al. Epidemiology of physical inactivity in Nigeria: a systematic review and meta-analysis. Journal of Public Health. 2021 May 13. https://doi.org/10.1093/pubmed/fdbab147 PMID: 33982123

13. World Health Organization (WHO). Non-communicable diseases (NCD) country profiles 2014 World Health Organization. 2015.

14. World Health Organization (WHO). Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva: World Health Organization; 2018.

15. World Confederation for Physical Therapy (WCPT). Policy statement: Physical therapists as exercise and physical activity experts across the life span; 2019.

16. ER-WCPT. Active and Healthy; the role of Physiotherapy in Physical Activity (Briefing Paper). General Meeting of the European Region of the WCPT; 2016.

17. Lowe A, Littlewood C, McLean S, Kilner K. Physiotherapy and physical activity: a cross-sectional survey exploring physical activity promotion, knowledge of physical activity guidelines and the physical activity habits of UK physiotherapists. BMJ open sport & exercise medicine. 2017 Dec 1; 3(1):e000290. https://doi.org/10.1136/bmjsem-2017-000290 PMID: 29119004
18. Freene N, Cools S, Bisset B. Are we missing opportunities? Physiotherapy and physical activity promotion: a cross-sectional survey. BMC Sports Science, Medicine and Rehabilitation. 2017 Dec; 9(1):1–8. https://doi.org/10.1186/s13102-017-0084-y PMID: 29214025

19. Abaraogu UO, Edeonuh JC, Frantz J. Promoting physical activity and exercise in daily practice: current practices, barriers, and training needs of physiotherapists in eastern Nigeria. Physiotherapy Canada. 2016; 68(1):37–45. https://doi.org/10.3138/ptc.2014-74 PMID: 27504046

20. Aweto HA, Oligbo CN, Fapojuwo OA, Olawale OA. Knowledge, attitude and practice of physiotherapists towards promotion of physically active lifestyles in patient management. BMC health services research. 2013 Dec; 13(1):1–8. https://doi.org/10.1186/1472-6963-13-21 PMID: 23316902

21. Oyeyemi AL, Ishaku CM, Oyekola J, Wakawa HD, Lawan A, Yakubu S, et al. Patterns and associated factors of physical activity among adolescents in Nigeria. PloS one. 2016 Feb 22; 11(2):e0150142. https://doi.org/10.1371/journal.pone.0150142 PMID: 26901382

22. Oyeyemi AL, Oyeyemi AY, Habib RY, Usman RB, Sunday JU, Usman Z. A survey of physicians and physiotherapists on physical activity promotion in Nigeria. Archives of physiotherapy. 2017 Dec; 7(1):1–8. https://doi.org/10.1186/s40945-017-0034-8 PMID: 29340200

23. World Health Organization (WHO). WHO guidelines on physical activity and sedentary behaviour. World Health Organization; 2020.

24. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandebroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Ann Intern Med. 2007; 147(8):573e7.

25. Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behav Res Methods. 2007 May; 39(2):175–91. https://doi.org/10.3758/bf03193146 PMID: 17695343.

26. Shirley D, van der Ploeg HP, Bauman AE. Physical activity promotion in the physical therapy setting: perspectives from practitioners and students. Phys Ther. 2010. 90(9), 1311–1322. https://doi.org/10.2522/ptj.20090383 PMID: 20651009

27. Sue V. M., & Ritter L. A. (2007). Conducting online surveys. Sage Publications.

28. Tavakol M, Dennick R. Making sense of Cronbach’s alpha. Int J Med Educ. 2011 Jun 27; 2:53–5. https://doi.org/10.5116/ijme.4dfb.8dld PMID: 28029643

29. Yona T, Ami NB, Azmon M, Weisman A, Keshet N. Physiotherapists lack knowledge of the WHO physical activity guidelines. A local or a global problem?. Musculoskeletal Science and Practice. 2019 Oct 1; 43:70–5. https://doi.org/10.1016/j.msksp.2019.07.007 PMID: 31352177

30. JadHAV RA, Gupta G, NatARaj M, Maiya GA. Knowledge, attitude and practice of physical activity promotion among physiotherapists in India during COVID 19. Journal of Bodywork and Movement Therapies. 2021 Apr 1; 26:463–70. https://doi.org/10.1016/j.jbmt.2020.12.042 PMID: 33992283

31. Federal Ministry of Health. Nigeria: National Strategic Plan of Action on Prevention and Control of Non-Communicable Diseases; 2015. Available from: http://www.health.gov.ng/doc/National%20Strategic%20Plan%20on%20NCDs.pdf

32. UN. Sustainable development goals; 2021. Available from: https://www.un.org/sustainabledevelopment/

33. Sachs J, Schmidt-Traub G, Kroll C, Lafortune G, Fuller G, Woelm F. Sustainable development/ 2020: The sustainable development goals and covid-19 includes the SDG index and dashboards. Cambridge University Press; 2021.

34. Abaraogu UO, Onah U, Abaraogu OD, Fawole HO, Kalu ME, Seenan CA. Knowledge, attitudes, and the practice of health promotion among physiotherapists in Nigeria. Physiotherapy Canada. 2019 Feb 12; 71(1):92–100. https://doi.org/10.3138/ptc.2017-79.gH PMID: 30787505

35. Brannan M, Bernardotto M, Clarke N, Varney J. Moving healthcare professionals—a whole system approach to embed physical activity in clinical practice. BMC medical education. 2019 Dec; 19(1):1–7. https://doi.org/10.1186/s12909-017-0084-y PMID: 30606170

36. Pollack Porter KM, Rutkow L, McGinty EE. The importance of policy change for addressing public health problems. Public Health Reports. 2018 Nov; 133(1_suppl):9S–14S. https://doi.org/10.1177/0033354918878880 PMID: 30426876

37. Health Education England (HEE). Making every contact count; 2021. Available from: https://www.makingeverycontactcount.co.uk/

38. Moving Medicine. Moving Medicine; 2021. Available: https://movingmedicine.ac.uk/

39. Pedersen MR, Hansen AF, Elmose-Osterlund K. Motives and Barriers Related to Physical Activity and Sport across Social Backgounds: Implications for Health Promotion. International journal of environmental research and public health. 2021 Jan; 18(11):5810. https://doi.org/10.3390/ijerph18115810 PMID: 34071630
40. Ball K, Carver A, Downing K, Jackson M, O'Rourke K. Addressing the social determinants of inequities in physical activity and sedentary behaviours. Health promotion international. 2015 Sep 1; 30(suppl_2): ii8–19. https://doi.org/10.1093/heapro/dav022 PMID: 25855784
41. The World Bank. The World Bank in Nigeria; 2020. Available: https://www.worldbank.org/en/country/nigeria/overview
42. Adeyanju O, Tubeuf S, Ensor T. Socio-economic inequalities in access to maternal and child healthcare in Nigeria: changes over time and decomposition analysis. Health policy and planning. 2017 Oct 1; 32 (8):1111–8. https://doi.org/10.1093/heapol/czx049 PMID: 28520949
43. Baum DR, Abdul-Hamid H, Wesley HT. Inequality of educational opportunity: the relationship between access, affordability, and quality of private schools in Lagos, Nigeria. Oxford Review of Education. 2018 Jul 4; 44(4):459–75.
44. Mayah E, Mariotti C, Mere CE, Odo CO. Inequality in Nigeria: Exploring the drivers. Oxfam International. 2017.
45. Conn VS, Chan K, Banks J, Ruppar TM, Scharff J. Cultural relevance of physical activity intervention research with underrepresented populations. International quarterly of community health education. 2014 Oct; 34(4):391–414.
46. Joseph RP, Keller C, Affuso O, Ainsworth BE. Designing culturally relevant physical activity programs for African-American women: a framework for intervention development. Journal of racial and ethnic health disparities. 2017 Jun; 4(3):397–409. https://doi.org/10.1007/s40615-016-0240-1 PMID: 27178447
47. Oluwasanu M, Oladunni O, Oladepo O. Multisectoral approach and WHO ‘Bestbuys’ in Nigeria’s nutrition and physical activity policies. Health promotion international. 2020 Dec; 35(6):1383–93. https://doi.org/10.1093/heapro/daaa009 PMID: 32087010
48. Oyeyemi AL, Oyeyemi AY, Omotara BA, Lawan A, Akinroye KK, Adedoyin RA, et al. Physical activity counselling among junior doctors in the UK: A qualitative study. Health Education Journal. 2021 Mar 8;0017896921999074.
49. Stenberg U, Vågan A, Flink M, Lynggaard V, Fredriksen K, Westermann KF, et al. Health economic evaluations of patient education interventions a scoping review of the literature. Patient education and counseling. 2018 Jun 1; 101(6):1006–35. https://doi.org/10.1016/j.pec.2018.01.006 PMID: 29402571
50. Forenbacher I, Husnjak S, Cvitić I, Jovović I. Determinants of mobile phone ownership in Nigeria. Telecommunications Policy. 2019 Aug 1; 43(7):101812.
51. Castro PC, Romano LB, Frohlich D, Lorenzi LJ, Campos LB, Paixão A, et al. Tailoring digital apps to support active ageing in a low income community. Plos one. 2020 Dec 10; 15(12):e0242192. https://doi.org/10.1371/journal.pone.0242192 PMID: 33301455
52. Akinyemi OO, Harris B, Kawonga M. ‘Our culture prohibits some things’: qualitative inquiry into how sociocultural context influences the scale-up of community-based injectable contraceptive in Nigeria. BMJ open. 2020 Jul 1; 10(7):e035311. https://doi.org/10.1136/bmjopen-2019-035311 PMID: 32690506
53. Musoke D, Atusingwize E, Ikhlile D, Nalinya S, Ssemugabo C, Lubega GB, et al. Community health workers’ involvement in the prevention and control of non-communicable diseases in Wakiso District, Uganda. Globalization and health. 2021 Dec; 17(1):1–1. https://doi.org/10.1186/s12992-020-00651-7 PMID: 33397377
60. Black B, Ingman M, Janes J. Physical therapists’ role in health promotion as perceived by the patient: descriptive survey. Phys Ther. 2016 Oct; 96(10):1588–1596. https://doi.org/10.2522/ptj.20140383 PMID: 27081205

61. Lobelo F, de Quevedo IG. The evidence in support of physicians and health care providers as physical activity role models. American journal of lifestyle medicine. 2016 Jan; 10(1):36–52. https://doi.org/10.1177/1559827613520120 PMID: 26213523

62. Brogan E, Duffield C, Denney-Wilson E. Start healthy & stay healthy a workplace health promotion intervention for new graduate nurses: Study protocol. Collegian. 2020 Oct 1; 27(5):573–80.