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UK physiotherapists delivering physical activity advice: what are the challenges and possible solutions? A qualitative study.

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16 6 ***UK physiotherapists delivering physical activity***
17 ***advice: what are the challenges and possible***
18 ***solutions? A qualitative study.***
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25 **ABSTRACT**

26 **Objectives:** Despite the known health benefits of physical activity (PA), PA levels are in
27 decline. Healthcare professionals (HCPs), including physiotherapists, have been
28 identified as ideal conduits to promote PA, yet their knowledge and awareness of PA
29 guidelines are poor. The aims of this study were to evaluate United Kingdom (UK)
30 physiotherapists' knowledge of the current PA guidelines and identify barriers and
31 possible solutions to delivering PA advice.

32 **Design:** A qualitative study using semi-structured interviews. Data were analysed using
33 an inductive thematic analysis using Braun and Clarke's six steps.

34 **Setting:** Various inpatient and outpatient clinical settings across six UK regions.

35 **Participants:** Eighteen UK based physiotherapists managing National Health Service
36 (NHS) patients, were recruited through volunteer sampling in March 2021.

37 **Results:** Five themes and 16 sub-themes were identified and separated according to
38 barriers and solutions to delivering PA advice. Barriers consisted of physiotherapist
39 intrinsic barriers (knowledge, fear/ confidence); patient barriers (compliance, expectations
40 and fear of doing PA); and lack of emphasis and priority given to PA (time constraints,
41 minimal educational and staff training). Solutions consisted of increasing awareness (staff
42 training, signposting awareness, use of social media and television campaigns) and
43 optimising delivery (use of visual resources, good communication and approaches
44 involving being individualised and gradual for patients with chronic conditions).

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3 45 **Conclusions:** Physiotherapists still have limited knowledge of the PA guidelines and are
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5 46 faced with barriers previously reported in the literature. Solutions suggested should be
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7 47 implemented to support physiotherapists delivering PA advice. Further research is
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9 48 needed to evaluate the efficiency of any implemented solutions supporting the delivery of
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11 49 PA advice.
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16 50 Keywords: Physical activity, physiotherapists, knowledge, awareness, advice
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19 20 52 **Strengths and Limitations of this study**

- 21
22 53 • This is the first study to review UK physiotherapists' knowledge of the updated
23
24 54 2019 CMO PA guidelines.
- 25
26 55 • This study not only identified physiotherapists' barriers to providing PA advice but
27
28 56 also identified possible solutions informed by these key stakeholders.
- 29
30 57 • The semi-structured interviews enabled flexible discussions to capture the
31
32 58 thoughts and opinions of the participants and to ensure responses could be
33
34 59 explored further.
- 35
36 60 • An inductive thematic analysis was applied to reduce the likelihood of researcher
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38 61 bias and maintain scientific rigour.
- 39
40 62 • Due to the qualitative nature, the study findings may not be representative of the
41
42 63 attitudes of all UK physiotherapists, however, it provides useful insights into their
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44 64 experiences.
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67 INTRODUCTION

68 Physical activity (PA) has multiple health benefits including reducing blood pressure,
69 improving insulin sensitivity and reducing risk factors leading to cardiovascular disease
70 (CVD).[1] The advice of the Chief Medical Officers (CMO) in the United Kingdom (UK) is
71 that adults should complete 150 minutes of moderate activity, or 75 minutes of vigorous
72 activity each week or a combination, alongside strength training at least twice weekly.[2]
73 Twenty-eight percent of adults globally fail to reach the recommended PA guidelines.[3]
74 In the UK this figure was slightly worse with 39% of the population failing to meet the PA
75 guidelines between 2019 and 2020,[4] 27% of which were classed as physically inactive,
76 meaning they did less than 30 minutes of moderate PA a week.[4] With physical inactivity
77 leading to 1.6 million deaths annually, and non-communicable diseases such as CVD
78 increasing, more needs to be done to tackle this worsening burden.[5] The COVID-19
79 global pandemic and associated restrictions, have led to more people working from home
80 and to the temporary closure of gyms and sports facilities, further decreasing PA levels
81 in the UK population.[6] This has resulted in decreased physical and functional capacity,
82 increased mental distress and an increased CVD risk profile.[7] Therefore, now more than
83 ever, public health policies and strategies to increase safe PA levels of the population
84 require urgent attention.[6]

85 The CMO identified HCPs as key conduits in the promotion of PA.[2] Physiotherapists are
86 found across multiple clinical areas and are seen as experts in non-invasive management
87 strategies, they are ideally placed to deliver PA guidance.[8] Physiotherapists reported
88 that health promotion, especially PA, was within their scope of practice (SOP).[9] Yet, like
89 other HCPs, only 16% knew all three components of the CMO PA guidelines, despite

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3 90 77% reporting that they discussed PA with patients according to a survey completed in
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5 91 2016 by 514 UK physiotherapists.[10] Of this sample, 12 participants were later followed
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7 92 up with interviews, where reported barriers to PA promotion included complexity of
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9 93 patients, work culture and a lack of time.[11] Lowe et al. also reported some facilitators
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11 94 such as having repeated appointments, collaborations with other services and building
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13 95 an alliance with the patient.[11]
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18 96 Solutions to successfully deliver PA guidance have yet to be explored in depth,
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20 97 particularly in the UK. Appropriate solutions are key to supporting changes in policy, but
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22 98 also guide immediate changes in a physiotherapist's management of patients. As
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24 99 knowledge of PA has been previously identified as poor amongst UK physiotherapists
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26 100 [10] prior to the updated CMO PA guidelines, it is yet unknown whether knowledge and
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28 101 awareness of the PA guidelines has improved. The aims of this present study were to
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30 102 understand the current knowledge physiotherapists have on PA guidelines, recognise
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32 103 common barriers experienced by physiotherapists when delivering PA advice and identify
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34 104 physiotherapist reported solutions to help successfully deliver PA guidance.
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39 105 **METHODS**

40 106 **Design**

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43 107 This study formed part of a larger qualitative study using semi-structured interviews aimed
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45 108 at exploring the knowledge and attitudes towards PA guidelines of a range of UK based
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47 109 HCPs, including general practitioners (GPs).[12] The standards for reporting qualitative
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49 110 research was followed throughout.[13] Ethical approval was granted by the Faculty of
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51 111 Biological Sciences at the University of Leeds (27 July 2020/ BIOSCI 19-039).
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112 **Participants and procedures**

113 The inclusion criteria for this study included UK based physiotherapists who currently
114 practised and managed National Health Service patients, from any clinical field, within the
115 UK.

116 Participants were recruited through advertisement on the Musculoskeletal bulletin on the
117 interactive Chartered Society of Physiotherapy (iCSP) portal as well as through LinkedIn
118 and by word of mouth. Willing participants followed a link to Microsoft Forms, where they
119 viewed the participant information sheet and completed an eligibility survey. Eligible
120 participants were emailed the participant information sheet to keep and a consent form,
121 which was signed and returned, an interview date was then arranged. Participants were
122 informed that they could withdraw from this study at any point. The recruitment and
123 interview process continued until data saturation was reached, when there were no more
124 emerging themes or new responses.[14]

125 **Patient and public involvement**

126 There was no patient involved in this study. Four healthcare professionals were involved
127 in guiding the planning and conduct of the study, with the lead researcher being a
128 physiotherapist.

129 **Data collection**

130 Interviews were semi-structured to enable elaboration of responses and to understand
131 participants' thoughts and beliefs.[15] The interview guide was adapted from Vishnubala
132 et al. [12] and included 30 interview questions which were split into five sections: 1)

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3 133 demographics; 2) PA education; 3) resources and interventions; 4) COVID-19; and 5)
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5 134 other, involving current thoughts on NHS banding structure. All interviews were conducted
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8 135 through Zoom by the lead researcher. The interviews took place from March 2021 until
9
10 136 May 2021 and were audio recorded. Interviews were automatically transcribed verbatim
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12 137 the same day by Zoom and stored securely on the University of Leeds OneDrive. Each
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14 138 participant was assigned a participant number, with any identifiable information
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17 139 anonymised.
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20 140 **Data analysis**

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23 141 An inductive thematic analysis approach following Braun and Clarke's six steps was
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25 142 undertaken: data familiarisation; coding; theme identification; revision of themes; defining
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28 143 and naming themes; and writing up.[16] This method was chosen for its flexibility, whilst
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30 144 providing in-depth complex data.[17] Participants' answers for each question were
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32 145 transferred into a Word document and similar responses were assigned a code, the
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34 146 number of responses under each code were also calculated. All grouped codes for each
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37 147 interview question were then collated in a separate document, evaluated for any common
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39 148 themes, and reviewed again once the themes were initially established. All steps were
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41 149 documented, repeated twice by the main researcher, and reviewed at each stage with the
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44 150 research team. Each theme was reviewed against the codes and transcriptions, to ensure
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47 151 it represented participant responses and to reduce the likelihood of researcher bias and
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49 152 maintain scientific rigour.[17,18] The software IBM SPSS statistics V.27 was used to
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51 153 describe participant characteristics, including gender, level of education, years of
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53 154 experience, healthcare setting and UK region, which were presented as proportions and
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56 155 frequencies. The number of years of experience were categorised into 0-5 years, 6-10,
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156 11-15, 16-20, and >21 years. Locations of work were grouped into UK regions. Example
 157 quotes from transcripts were presented in tables for each theme.

158 RESULTS

159 Participant characteristics

160 Twenty-one participants completed the eligibility survey, though one participant did not
 161 meet the inclusion criteria and a further two failed to return the consent form. Therefore,
 162 18 interviews were included in this study (86% response rate). Interview length ranged
 163 from between 35 to 72 minutes. Demographics can be seen in Table 1. The sample
 164 consisted of physiotherapists across six different regions, with 67% female and 61%
 165 working in outpatient settings. Fifty percent of the sample had less than five years of
 166 experience and 56% had either a postgraduate diploma or a masters level qualification.

167 **Table 1. Participant characteristics of 18 physiotherapists**

Characteristic	Category	n (%)
Gender	Male	6 (33.3)
	Female	12 (66.7)
Level of education	BSc or equivalent	8 (44.4)
	BSc + postgraduate diploma	3 (16.7)
	BSc + MSc	7 (38.9)
Years of experience	0-5	9 (50)
	6-10	6 (33.3)

	11-15	0 (0.0)
	16-20	2 (11.1)
	21+	1 (5.6)
Healthcare setting	Inpatients	5 (27.8)
	Outpatients	11 (61.1)
	Both	2 (11.1)
UK region	West Midlands	3 (16.7)
	East Midlands	8 (44.4)
	Yorkshire and Humber	4 (22.2)
	North West	1 (5.6)
	London	1 (5.6)
	Scotland	1 (5.6)

BSc, Bachelor of science; MSc, Master of Science; n, number; UK, United Kingdom.

Thematic themes

Following thematic analysis, five themes and 16 sub-themes were identified from the interview transcripts. These were broken down into barriers and solutions to promoting and delivering PA guidance.

Barriers

Theme 1: physiotherapy intrinsic barriers

In relation to the CMO PA guidelines, 22% of physiotherapists correctly stated the three components of the guidelines (150 minutes of moderate or 75 minutes of vigorous aerobic

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3 179 activity and twice weekly strength training), whilst 39% did not know any of the guidelines.
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5 180 Vigorous PA was the most incorrectly answered or unknown guideline, followed by
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8 181 strength recommendations.
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11 182 Sixty-seven percent of the physiotherapists admitted that they had either not heard of or
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13 183 read the CMO PA guidelines and 72% would not know where to find them. Sixty seven
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15 184 percent had also not seen any of the accompanying resources, such as infographics.
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18 185 Eighty-three percent reported knowledge as the main intrinsic barrier to delivering PA
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20 186 advice (seen in Table 2). Whilst 33% reported that low confidence and fear of giving PA
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22 187 advice in case something went wrong, were barriers to some physiotherapists, 39%
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24 188 reported that they personally felt fairly confident discussing PA with a patient and a further
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27 189 28% felt very confident.
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190 **Table 2. Physiotherapy intrinsic barriers to delivering PA advice with two sub-themes identified through 18**
 191 **interviews of physiotherapists**

Sub-theme	Percentage sharing this opinion, n (%)	Example quotes
Lack of knowledge of the PA guidelines	15 (83.3) mentioned lack of PA knowledge as a barrier.	<p><i>"I guess my lack of knowledge of the exact parameters that we should be advising. So, I think because I'm not 100% sure how many minutes I should be giving, I don't want to advise patients wrongly."</i></p> <p><i>"My lack of knowledge in terms of not being up to date with what needs to be done in certain cases. Like, if it's like chronic low back pain or diabetes, or some such diseases, I know what to do, but if there's something beyond this which I haven't read or talked about or it's a more complicated presentation, this is what kind of keeps me a bit apart for not giving that advice."</i></p>
Confidence/ fear of giving PA advice	6 (33.3) mentioned confidence/ fear as a barrier to some physiotherapists giving PA advice.	<p><i>"I think there is a bit of fear of giving the wrong advice and getting penalised for that and also kind of an anxiety is if you've given some advice and it hasn't helped, will you be held accountable?"</i></p> <p><i>"We know physiotherapy as an intervention doesn't have too many risks associated and certainly not severe ones like other interventions, but I think when we prescribe exercises that tends to be maybe one of the more risky things we do. And so yes, I'd probably say the fear associated with what if it goes wrong, and I think maybe a lack of support from, whether it's the company in terms of training or support."</i></p>

192 n, number of participants; PA, physical activity.

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4 193 Theme 2: lack of emphasis and priority given to PA
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7 194 There were multiple barriers that focused on lack of emphasis and priority given to
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9 195 promoting PA, identified by the physiotherapists (seen in Table 3). These included many
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11 196 expressing that they received minimal training on PA, both at university and through
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13 197 continuing professional development (CPD) offered at work. Time was a common barrier
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15 198 and issue amongst those interviewed, often because of multiple tasks required within an
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17 199 appointment that were considered a greater priority. Work culture, staffing shortages and
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19 200 pressures for quick discharges were other less common barriers mentioned by some.
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201 **Table 3. Lack of emphasis and priority given to delivering PA advice and three sub-themes identified through 18**
 202 **interviews of physiotherapists**

Sub-theme	Percentage sharing this opinion, n (%)	Example quotes
Lack of CPD training at work	9 (50.0) mentioned they have received no CPD training since qualifying	<p><i>"We have not had any postgraduate or sort of say with, you know, in house extensive training around physical activity, just more something that we touch on. That is if you're looking at you know management of low back pain, we might then say, but physical activity, eg. walking, is important but there won't be much depth behind physical activity as a topic."</i></p> <p><i>"Since graduating, I don't think that I've had any specific further training on specific like recommendations for physical activity."</i></p> <p><i>"In terms of my physiotherapy training specifically, I've not had much specific training on physical activity."</i></p>
Lack of emphasis through training at university level	10 (60.1) reported covering PA to some extent 5 (27.8) reported not covering it at all minimally	<p><i>"So, I guess the university BSc course I did there was some sort of exercise prescription, strength and conditioning type tutoring, but I think it was one or two lectures and tutorials so it made up of a small part of kind of the course and our studies."</i></p> <p><i>"I think, would probably fairly minimal training undergrad because it was quite long ago I trained."</i></p> <p><i>"So we've obviously done a bit on health promotion and health activity in university. There was probably a lecture or two on it. There was also an optional module which I opted not to take."</i></p>
Time pressures	10 (60.1) reported time as a barrier to delivering PA	<p><i>"If you have someone coming in to see you with a specific condition, so if it is pain or with an injury or whether it is acute or long term, you are going to have time to go through that, assess it before your objective assessment, provide them with advice and specific exercises for that condition. Write the notes, get them booked in, write out the exercises, whatever it is. And if you want to give that advice on top of that, you just don't have time, so if you've got someone coming to a specific condition that's going to take priority over general lifestyle advice, even if we feel as though that they may really benefit from that, so time is a huge factor."</i></p>

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“It also might be that you just don't have the time to do it and give that advice, because you're under so much pressure from your patient caseload and so time is definitely a barrier.”

203 n, number; PA, physical activity, CPD, continuing professional development.

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3 204 Theme 3: patient barriers to delivering PA
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6 205 Another common theme amongst physiotherapists was patient limitations to delivering
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8 206 PA advice (seen in Table 4). This included physiotherapists reporting that patients often
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11 207 had low compliance to home management, particularly with exercise. Patient fear of doing
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13 208 PA, in case of reinjury or exacerbation of symptoms, was also a reoccurring response,
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15 209 particularly for patients who had chronic conditions, with low PA levels. Another common
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17 210 barrier was patient expectations of physiotherapy management, which would often not
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19 211 align with exercise or PA advice, with many reporting that patients would prefer quick
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21 212 fixes and passive treatments such as massage.
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213 **Table 4. Patient barriers to delivering PA and three sub-themes identified through 18 physiotherapist interviews**

Sub-theme	Percentage sharing this opinion, n (%)	Example quotes
Patient compliance.	6 (33.3) reported patient compliance as a barrier.	<p><i>"Sometimes your patients just don't want to do it, they won't have any of it. I think there's a mixture of reasons that you can't really just pinpoint to on certain factors that affects just how you might deliver physical activity advice kind of thing, because sometimes patients are just not on board and with behaviour modification. With behaviour motivational interviewing, you definitely need them to have some sort of interest before actually trying to then even try doing anything really because if they are not on board, they are not going to do it when you tell them."</i></p> <p><i>"I guess sometimes maybe the compliance. Again, I'm just thinking about the demographic of some patients that I see, they may find it quite hard to change the amount of physical activity or find that it's not something that they're necessarily prioritising or too willing to do so maybe that behaviour change element."</i></p>
Patient fear of exercise.	4 (22.2) mentioned patient fear and confidence of doing exercises as a barrier.	<p><i>"Kind of what I've experienced a lot recently is people that have come in with say like pain or you know, like crepitus in the knee. And quite fearful of movement and quite fearful of exercise and kind of have that fear avoidance."</i></p> <p><i>"Quite often, in regards of exercise as well, any physical activity is a fear avoidance, patients are just afraid to do and make things worse."</i></p>

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Expectations of physiotherapy.	5 (27.8) mentioned patient expectation of physiotherapy as a barrier.	<p><i>“Patient expectations of a physio appointment. So, if they're just wanting manual therapy, for example, and we're chewing their ear off about walking more and keeping themselves active and moving or trying to encourage them to pick up a new hobby if they are pretty sedentary, then that could be a barrier as well.”</i></p> <p><i>“We see a lot of chronic pain patients who are looking for a quick fix. And they might turn towards medications or massage or other passive interventions, which actually I try and use the analogy to patients around chronic pain that it's not a machine that can be fixed or should be fixed, but instead of garden that we should try and tend to regularly and, and then that way we may have better success at keeping on top of chronic pain.”</i></p>
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214 n, number of participants; PA, physical activity.



215 **Solutions**

216 Solutions and successful approaches to managing both chronic and acute patients were
217 discussed in the interview, in addition to their opinions on the most efficient and effective
218 ways to communicate the PA guidelines.

219 Theme 4: increasing awareness

220 A key theme identified from physiotherapists in response to successfully promoting PA to
221 patients was to increase awareness of the PA guidelines (see Table 5). Most responses
222 included improved staff training with some suggesting it should be a mandatory annual
223 module and others proposing having more group discussions between staff on PA and
224 its benefits. Awareness of local initiatives and exercise referral schemes (ERS) to enable
225 signposting was also recommended as a solution, particularly for those with time
226 constraints and to support the patients more long-term. To increase awareness and
227 knowledge of physiotherapists many suggested using social media, such as Twitter or
228 LinkedIn, by following influential people in the field and listening to podcasts. Social media
229 was also recommended as a useful tool to raise awareness to the younger populations
230 and those who regularly use technology. For populations less suited to social media many
231 physiotherapists suggested television advertisement to engage more people and spread
232 awareness of the PA guidelines.

233 **Table 5. Increasing awareness as a solution to delivering PA advice with four sub-themes identified through 18**
 234 **physiotherapist interviews**

Sub-theme	Percentage sharing this opinion, n (%)	Example quotes
Staff training.	11 (61.1) mentioned staff training as a solution to delivering PA advice.	<p><i>"I think better ongoing potentially mandatory training or better kind of educational pieces that go out across the board."</i></p> <p><i>"If we do it as a yearly in-service training, just as a refresher, it makes it more accessible, because if someone's a bit embarrassed or they don't want to ask when they feel they should know, but they don't know where to know, if you do it as a training for the whole team then that's not targeting anyone, but it is very informative."</i></p>
Use of campaigns through television and advertising.	11 (61.1) mentioned television/advertising would support the implementation of PA guidelines.	<p><i>"I think TV ads would be quite useful. Often when I'm prescribing exercises to patients that are very sedentary, I use the advert break, as an example of when they could get up change their posture, move around. Do something, do their exercises if they so desire. So having an actual maybe government led advertisement, because the people that are going to see that are the ones that have sat all day in front of the TV."</i></p> <p><i>"Kind of just campaigning that everybody should be doing, you know even just like adverts on TV, you know, like so it's kind of in people's faces a bit more frequently and every day."</i></p>
Use of social media.	13 (72.2) mentioned social media would support the implementation of PA guidelines.	<p><i>"So, I think social media has a part to on that because I said, if you can get a message on there that's going to see a lot of audience members obviously so I think getting information on there."</i></p> <p><i>"Um yeah I mean social media is really good isn't it, it's a really good way to engage lots of the population, so that is, you know, that would be useful, having more stuff on social media."</i></p>

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Signposting to other exercise services. 10 (60.1) mentioned signposting and having better referral systems and knowledge of available services as a solution to delivering PA advice.

"I think we're quite lucky particularly in Sheffield in that we've got sort of for those patients who we know are safe and obviously are happy to do activity we've got a lot of referral schemes, so we've basically got like SPARS [Sheffield Physical Activity Scheme] access which has got physical activity guidance, and so we can actually send them through to health trainers. So they give again further guidance on exercise obviously dieting and things like that."

"So, one of the ways I think was having further links with like community, like gyms or, like other outdoor spaces. They could yeah link in with that you can like continue the programme after it's like just a clinical referral and, like the six weeks, whatever and then after that the physical activity should carry on."

235 n, number; PA, physical activity.

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3 236 Theme 5: optimising the delivery of PA
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6 237 Successful approaches were discussed in terms of delivering PA advice to both chronic
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8 238 and acute patients and how promotion can be optimised (see Table 6). With patient
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10 239 barriers in mind, many participants suggested ensuring any PA prescription should be
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12 240 individualised, functional and based on what the patient enjoys. Many also reported
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14 241 communication as a key factor and that the language used should not be patronising,
15
16 242 forceful or lack empathy, which echoed the advice physiotherapists would give towards
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18 243 encouraging less enthusiastic colleagues to promote PA. To facilitate discussions and
19
20 244 support patients, visual resources, such as infographics, were advocated; some
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22 245 suggested giving them to patients after an appointment or displaying them in waiting
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24 246 rooms and toilets. Other visual resources, such as leaflets and handouts, were also
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26 247 mentioned.
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248 **Table 6. Optimising delivery of PA advice with five subthemes identified through 18 physiotherapist interviews**

Sub-theme	Percentage sharing this opinion, n (%)	Example quotes
Make PA individualised and functional.	12 (66.7) mentioned making PA advice individualised for those with chronic conditions.	<p><i>“Get to know them as an individual, so ask them their current hobbies and the types of activities that they are interested in. So that I can tailor the activity to their needs and something that I think they are likely to do.”</i></p> <p><i>“So, I think a lot of it just stems from informing the patient or educating the patient, you know how important is as an intervention. But then, having that shared discussion with them about coming up with a shared action plan, and then using self-exploration as a means for them to go away and find a level and find what they enjoy and what works for them.”</i></p>
Have gradual approach to introducing PA.	8 (44.4) mentioned having a gradual approach to PA for chronic patients and as a top tip for PA promotion.	<p><i>“If someone's got a long-term condition, it might be more of a structured manner, so I might start off really small and then, catch up with them, see how they responded to it and then incremental it up and just progress things on a lot slower.”</i></p> <p><i>“If they have had pain a long time, I would probably want to at least begin at a low manageable intensity or volume, and then have that graded exposure to it, so gradually building things up as to, so they can not only build confidence, but they're able to manage it without having regular flareups.”</i></p>
Supportive communication.	5 (27.8) mentioned using less forceful language when promoting PA to patients.	<p><i>“I think appreciating where patients are. So, kind of sympathising with the fact that they're in pain, in particular for chronic patients with chronic problems. You know I hear a lot that people don't listen, believe me, they think I'm putting it on, or they think I should be able to do more and I think just understanding and empathising is a really good starting point, because I think once people feel listened to, then they're more likely to take on board the advice of education that you can offer them.”</i></p> <p><i>“The biggest thing I've learned is to not ram it down their throat and try and come across you know better because, it just really pisses people off, but, in terms of trying to just say this is what you could be doing, how much of that do you think you could manage which sounds like it's doable for you and kind of go from there seems to work quite reasonably well.”</i></p>

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Use of visual resources. 7 (38.9) mentioned infographics as a good resource to raise awareness of the PA guidelines.

"I'd say if I have to pick one, I would go for the government infographics just because they've got the information that you can print out and stick up. So, you've got everything you need and is not in depth and it's obviously patient friendly as well, so it is simple, for everyone, and everyone can understand it, so I'd probably say that's the best resource, in my opinion."
"Infographics, so if you've got certain clinicians who are visual learners, let's say, using things like that they might be ones that they can print off, put up in their clinic rooms. I've seen that before and facilitates that discussion with the patient."

249 n, number; PA, physical activity

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250 **DISCUSSION**

251 The aims of this study were to understand UK physiotherapists' PA knowledge and
252 identify the main barriers and solutions to delivering PA guidance. This study found that
253 few physiotherapists knew the UK CMO PA guidelines, despite being updated in 2019
254 and identifying HCPs including physiotherapists, as key to disseminating the guidelines
255 [2]. Further, very few knew where to access the guidelines and associated infographics.
256 Common barriers found included: lack of time, low confidence, limited PA training at
257 university and through CPD once qualified, in addition to patient expectations, compliance
258 and fear of exercise. Solutions, separated into increasing awareness of the PA guidelines
259 and optimising delivery of the PA guidelines, consisted of using television advertisement
260 campaigns and social media to spread awareness; increased staff training; signposting
261 to local services; following individualised and gradual approaches for chronic patients;
262 having good communication; and use of visual resources, such as infographics, to
263 facilitate the PA advice given by physiotherapists.

264 **Barriers**

265 Physiotherapy knowledge and intrinsic factors

266 Having knowledge and awareness of the PA guidelines is a key factor in being able to
267 successfully promote them. With 22% correctly identifying all three components in this
268 study, it was only slightly higher than the 16% of UK physiotherapists previously
269 reported.[11] This suggests that the updated CMO PA guidelines in 2019 have had little
270 impact on the knowledge or awareness of physiotherapists. Awareness of the guidelines

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3 271 and where to locate them were other common issues identified in this present study. Poor
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5 272 awareness of the CMO PA guidelines was also reported by Vishnubala et al. in their
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7 273 qualitative study of 15 GPs. [12] Another larger study of 1,013 GPs found that 30% had
8
9 274 never heard of the CMO PA guidelines and a further 50% had heard of them but were
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11 275 very unfamiliar.[19]
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15 276 Fears of litigation are prevalent in healthcare which can prevent HCPs from delivering
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17 277 some treatments. De Vivo and Mills identified fear and a perception of vulnerability as a
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19 278 barrier experienced by 10 midwives who gave PA advice to pregnant patients,[20] which
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21 279 was also reported by nurses and GPs who managed diabetic patients, leading to
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23 280 disengagement in PA advice.[21] Similarly, Lowe et al. highlighted that PA discussions
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25 281 were more difficult with complex patients.[11] A survey of 7,026 GPs in 2012, found that
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27 282 many would practise defensively, particularly for high-risk patients due to the impact of
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29 283 complaints.[22] This perceived risk, could be attributed to lack of knowledge of how to
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31 284 adapt PA to the patient's needs leading to a lack of confidence giving the advice. Yet,
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33 285 39% in this present study were fairly confident and a further 28% were very confident
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35 286 giving PA advice, which may be due to physiotherapists seeing health promotion as part
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37 287 of their SOP and feel able to give advice based on experience rather than specific
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39 288 guidelines. Indeed, physiotherapists have at least some confidence in providing basic PA
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41 289 advice, though are possibly more fearful with complex patients due to the increased risks.
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49 290 Lack of emphasis and priority

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52 291 Lack of emphasis and priority placed on PA is another barrier faced by physiotherapists
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54 292 in this study. Time pressures during assessments are a frequent challenge for many, with
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3 293 time being the most cited barrier by 22 UK inpatient physiotherapists during focus
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5 294 groups.[9] Time pressures during appointments have an impact on the ability to give
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8 295 advice, leading to prioritisation of tasks and often significantly less lifestyle advice being
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10 296 provided.[23] Furthermore, perceptions of PA advice being a low priority need changing,
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12 297 which would require training and a greater emphasis amongst HCPs. Notably, despite
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14 298 over half of the physiotherapists completing a postgraduate diploma or master's degree
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16 299 in this study, many reported inadequate training on PA, questioning the integration of
17
18 300 health promotion in the curriculum. Yet, physiotherapy students who took part in focus
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20 301 groups, reported receiving academic public health training and reported completing public
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22 302 health qualifications whilst at university.[24] This suggests that while public health topics
23
24 303 are being taught at university, a possible lack of emphasis and importance placed on PA
25
26 304 and how to promote PA effectively, is leading to the knowledge not being sustained. This
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28 305 lack of emphasis seems to be continued post qualification with 55% of GPs reporting not
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30 306 receiving any CPD on PA since leaving university [19].
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36 307 Patient barriers

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39 308 Patient barriers for taking up PA advice can heavily impact on clinical outcomes if not
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41 309 identified and addressed. Low patient compliance was a re-emerging barrier in this study,
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43 310 which reflected previous findings where 24% of Australian physiotherapists agreed PA
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45 311 advice would not change a patient's behaviour.[25] UK based Pakistani women identified
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47 312 that exercise based management did not meet cultural needs, leading to poor
48
49 313 compliance.[26] Patient demographics can also influence compliance, with smokers and
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51 314 the elderly less likely to change their PA levels.[27] Additionally, patient expectations of
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53 315 physiotherapy can lead to poor compliance, with some patients more reliant on passive
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3 316 treatments such as massage compared to active treatments such as exercise.[28]
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5 317 Regardless of expectations, patient fear can affect compliance, often as a result of
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7 318 exercise misconceptions, poor clinician communication or negative past experiences,
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9 319 leading to the perception that PA is harmful and causing fear avoidance.[29, 30] Fear
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11 320 avoidance of PA, particularly with chronic musculoskeletal conditions, can impact on
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13 321 clinical outcomes and rehabilitation if not addressed.[31] Patient barriers should not be
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15 322 overlooked when promoting PA and therefore strategies to optimise compliance, reduce
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17 323 fear and manage expectations are vital for succeeding in behaviour change.
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23 324 **Solutions**

24 25 26 325 Increasing awareness

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29 326 Increasing awareness of the PA guidelines to both patients and physiotherapists was one
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31 327 solution identified in this study. Indeed, with inadequate training reported, there is a need
32
33 328 for improvements in undergraduate and staff training, an opinion also expressed by other
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35 329 HCPs.[12,21] A possible explanation for this is that many physiotherapists often
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37 330 incorporate exercise prescription into a patient's management plan and so feel they
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39 331 already have the skills to deliver PA advice to some extent.[32] Nevertheless, with limited
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41 332 knowledge of the CMO PA guidelines, staff training would benefit physiotherapists giving
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43 333 them confidence in discussing PA with any patient. Awareness of local services and ERS
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45 334 available to facilitate signposting can also support physiotherapists that lack confidence
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47 335 providing specific PA guidance. To improve adherence, exercise professionals have
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49 336 suggested that HCPs should understand the schemes they signpost to, so that they are
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51 337 not used as a last resort and ensure the patient is motivated to participate.[33] Signposting
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3 338 appears to be an effective solution to PA promotion, though this requires the availability
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5 339 of schemes, and awareness and understanding for HCPs to appropriately refer patients
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8 340 to these services.[21]
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10 11 341 Optimising delivery

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14 342 Optimising the delivery of PA guidance is essential for patient understanding, compliance
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16 343 and subsequent clinical outcomes. Graded exposure to PA for those who are fearful or
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18 344 deconditioned was one of the proposed successful approaches to delivering PA guidance
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21 345 in this study and has previously been reported as an effective sustainable approach to
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23 346 prescribing exercise [31] whilst still offsetting the adverse effects that being inactive can
24
25 347 cause .[34] Making PA individualised, with consideration of patient preferences to build
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28 348 confidence is more favourable by patients.[35] This person centred approach, in addition
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30 349 to goal setting and self-monitoring, has been found to be an effective behavioural change
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32 350 technique, leading to long term change in physical activity levels.[36] Moreover, use of
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35 351 other behavioural therapies, such as acceptance and commitment therapies (ACT), which
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37 352 were developed from cognitive behavioural therapy (CBT) can be used to direct
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39 353 development of interventions to sustain long term behaviour change and adherence to
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41 354 PA.[37] Additionally, good communication has been found to be crucial to challenge the
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44 355 misconceptions leading to poor adherence, especially in chronic patients where pacing is
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46 356 advised,[29] whereas forceful or patronising language discouraged patients from
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48 357 communicating their concerns.[38] Furthermore, there are multiple factors that can
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51 358 influence a patient's response to PA advice and therefore, the approach taken and
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53 359 language used is vital for successful changes in behaviour and thus needs to be carefully
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55 360 considered by HCPs.
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3 361 To further facilitate discussions, visual resources, such as leaflets, have also been
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5 362 suggested to reinforce advice given to patients.[12] HCPs have previously reported
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7 363 leaflets as a convenient concise way to help focus information during a consultation and
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10 364 more convenient than using websites.[21] Freene et al. found that 93% of an Australian
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12 365 physiotherapy sample also agreed having resources would be useful for promoting
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14 366 PA.[25] Leaflets have been found to improve patient satisfaction, communication and
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16 367 reduced need for reassessments of the same pathology in French emergency
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18 368 departments.[39] Additionally, infographics have been found to be an effective visual way
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20 369 to convey complex information on PA, though the effectiveness of influencing health
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22 370 behaviour change is unknown.[40] In this study some participants reported displaying the
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24 371 CMO PA infographics in waiting rooms and toilets, which increases exposure to the PA
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26 372 guidelines and may facilitate discussions. However, as the CMO PA infographics are
27
28 373 aimed towards HCPs, consideration is needed to ensure displayed information is not too
29
30 374 complex to meet the needs of patients.[41] Visual resources can assist physiotherapists
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32 375 in promoting PA and reinforce the message delivered during the appointment, though
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34 376 must involve patient friendly material.
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41 377 **Strengths and limitations**

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44 378 To the authors' knowledge, this is the first study to review UK physiotherapists' knowledge
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46 379 of the updated 2019 CMO PA guidelines and explore, in depth, physiotherapists'
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48 380 perceived solutions to address the barriers faced when delivering PA guidance. Virtual
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50 381 interviews conducted online enabled recruitment of physiotherapists from all over the
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52 382 country, increasing the representation across different geographical areas. Additionally,
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54 383 the sample contained a range of clinical expertise and years of experience. The interview
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3 384 questions enabled flexibility to responses and encouraged reflection of personal practices
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5 385 on delivering PA advice that could help improve the promotion of PA guidelines.
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7 386 Moreover, this study highlights the importance of holding dialogue with physiotherapists
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10 387 when identifying solutions for promoting the CMO guidelines. Limitations included
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12 388 increased risk of bias due to having a volunteer sample, with those who are more
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14 389 enthusiastic about PA being more likely to participate. Greater depth in the analysis of
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16 390 themes by comparing the different clinical fields of physiotherapy would have added value
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18 391 and enable more specific solutions to each clinical field. Finally, although efforts were
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20 392 made to reduce researcher bias by reviewing and discussing the themes to ensure
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22 393 reliability of interpretations, and through following Braun and Clarke's six steps, there was
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24 394 still a risk of bias when interpreting the results.
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29 395 **Clinical implications**

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32 396 As barriers and knowledge appear to be unchanged with time, action is needed both at
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34 397 university level and through CPD to increase knowledge and awareness of the PA
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36 398 guidelines. Physiotherapists should accept responsibility of their own development on PA
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38 399 knowledge and reflect on their current practices, comparing to the optimised approaches
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40 400 suggested in this study and adapt accordingly. Following this study, future research needs
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42 401 to explore any differences in the barriers and solutions to delivering PA advice between
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44 402 various clinical fields of physiotherapy. Following this, action is needed to begin
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46 403 implementing the solutions raised, to challenge these persisting barriers and to evaluate
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48 404 the effectiveness of these solutions in supporting physiotherapists delivering PA advice.
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50 405 Consideration of behavioural change techniques and use of ACTs can help to guide
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52 406 development of interventions for either clinicians or patients to improve and sustain PA
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3 407 levels in the population. The continued involvement of physiotherapists started within this
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5 408 study is important in shaping such solutions.
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8 409 **CONCLUSION**

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12 410 Despite updates to the CMO PA guidelines and previous research highlighting barriers to
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14 411 physiotherapists delivering PA advice, the same barriers including time, inadequate
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16 412 training and poor patient adherence remain. Whilst physiotherapists have some
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18 413 confidence delivering PA advice, knowledge of the guidelines was limited. Increasing
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20 414 awareness and optimising delivery of PA were identified as the main solutions to
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22 415 increasing PA promotion, with a greater emphasis needed on PA in training and specific
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24 416 approaches to increase the efficiency of giving PA advice being suggested. These
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26 417 findings can help to facilitate implementation of the solutions and future research should
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28 418 then evaluate the effectiveness of the implemented strategies in supporting PA
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30 419 discussions, to increase the public's PA levels.
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3 428 **Declarations**
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6 429 **Ethics approval and consent to participate**
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8 430 Ethical approval was granted by the Faculty of Biological Sciences at the University of
9 431 Leeds (27 July 2020/ BIOSCI 19-039). All participants were given a study information
10 432 sheet and gave informed consent to participate.
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13 433 **Consent for publication**
14

15 434 Not applicable.
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18 435 **Availability of data and materials**
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20 436 The datasets generated and analysed during the current study are not publicly available
21 437 due to all material used in the analysis being reports and not databases. However, the
22 438 data are available from the corresponding author on reasonable request.
23
24

25 439 **Competing interests**
26

27 440 The authors declare that they have no competing interests.
28
29

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31

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33
34

35 443 **Authors' contributions**
36

37 444 AS, DV and CN contributed to the study design; AS led data collection and analysis,
38 445 supervised by DV and CN. AS and CN led the drafting of the manuscript. All authors read,
39 446 revised, and approved the final version of the manuscript.
40
41

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47 449 **Authors' information (optional)**
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SRQR checklist

	Reporting item	Line number
Title (#1)	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	6-8
Abstract (#2)	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	25-49
Introduction		
Problem formulation (#3)	Description and significance of the problem /phenomenon studied: review of relevant theory and empirical work; problem statement	67-101
Purpose or research question (#4)	Purpose of the study and specific objectives or questions	101-104
Methods		
Qualitative approach and research paradigm (#5)	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed together.	128-151
Researcher characteristics and reflexivity (#6)	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	125-128
Context (#7)	Setting / site and salient contextual factors; rationale	134-136
Sampling strategy (#8)	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	116-124
Ethical issues pertaining to human subjects (#9)	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	110-111, 119-120

Data collection methods (#10)	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	129-138
Data collection instruments and technologies (#11)	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	129-138
Units of study (#12)	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	159-168 (results)
Data processing (#13)	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation / deidentification of excerpts	136-139
Data analysis (#14)	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	141-157
Techniques to enhance trustworthiness (#15)	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	146-152
Results/findings		
Syntheses and Interpretation (#16)	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	171-249
Links to empirical data (#17)	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	190-192, 201-203, 213-214, 233-235, 248-249
Discussion		
Intergration with prior work, implications, transferability and contribution(s) to the field (#18)	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	251-376, 395-408
Limitations (#19)	Trustworthiness and limitations of findings	377-394
Other		
Conflicts of interest (#20)	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	439-440

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Funding (#21)	Sources of funding and other support; role of funders in data collection, interpretation and reporting	441-442
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For peer review only

BMJ Open

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16 6 ***UK physiotherapists delivering physical activity***
17 ***advice: what are the challenges and possible***
18 ***solutions? A qualitative study.***
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25 ABSTRACT

26 **Objectives:** Despite the known health benefits of physical activity (PA), PA levels are in
27 decline. Healthcare professionals (HCPs), including physiotherapists, have been
28 identified as ideal conduits to promote PA, yet their knowledge and awareness of PA
29 guidelines are poor. The aims of this study were to explore United Kingdom
30 physiotherapists' current knowledge of the PA guidelines and identify barriers and
31 possible solutions to delivering PA advice.

32 **Design:** A qualitative approach using semi-structured interviews that took place between
33 March 2021 and May 2021. Data were analysed using an inductive thematic analysis
34 using Braun and Clarke's six steps.

35 **Setting:** Various inpatient and outpatient clinical settings across six UK regions.

36 **Participants:** Eighteen UK based physiotherapists managing National Health Service
37 patients, were recruited through volunteer sampling in March 2021.

38 **Results:** Five themes and 16 sub-themes were identified and separated according to
39 barriers and solutions to delivering PA advice. Barriers consisted of physiotherapist
40 intrinsic barriers (knowledge, fear/ confidence); patient barriers (compliance, expectations
41 and fear of doing PA); and lack of emphasis and priority given to PA (time constraints,
42 minimal educational and staff training). Solutions consisted of increasing awareness of
43 the PA guidelines (staff training, signposting awareness, use of social media and
44 television campaigns) and optimising delivery (use of visual resources, good
45 communication and approaches involving being individualised and gradual for patients
46 with chronic conditions).

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3 47 **Conclusions:** Physiotherapists appear to have limited awareness of the PA guidelines
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5 48 despite the recent updates, and are faced with similar barriers that were previously
6
7 49 reported in the literature. The solutions suggested should guide strategies to support
8
9 50 physiotherapists being able to deliver PA advice. Further research is needed to evaluate
10
11 51 the efficiency of any implemented solutions supporting the delivery of PA advice.
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15 52 **Keywords:** Physical activity, physiotherapists, knowledge, awareness, advice
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19 54 **Strengths and Limitations of this study**

- 20 55 • This study not only identified physiotherapists' barriers to providing PA advice but
21 56 also identified possible solutions informed by these key stakeholders.
 - 22 57 • The semi-structured interviews enabled flexible discussions to capture the
23 58 thoughts and opinions of the participants and to ensure responses could be
24 59 explored further.
 - 25 60 • An inductive thematic analysis was applied to reduce the likelihood of researcher
26 61 bias.
 - 27 62 • Due to the qualitative methodology, the study findings cannot be generalised to
28 63 all UK physiotherapists, however, it provides useful insights into their
29 64 experiences.
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49 66 **INTRODUCTION**

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52 67 Physical activity (PA) has multiple health benefits including improving mental health,
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54 68 reducing risk factors leading to cardiometabolic diseases, and improving physical health
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3 69 in cancer survivors.[1,2] The advice of the Chief Medical Officers (CMO) in the United
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5 70 Kingdom (UK) is that adults should complete 150 minutes of moderate activity, or 75
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7 71 minutes of vigorous activity each week or a combination, alongside strength training at
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10 72 least twice weekly.[3] This is similar to the World Health Organisation (WHO) guidelines
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12 73 of at least 150-300 moderate intensity aerobic PA, or 75 to 150 vigorous intensity PA,
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14 74 with twice weekly strength training [4] Twenty-eight percent of adults globally fail to reach
15
16 75 the recommended aerobic PA guidelines.[5] In the UK this figure was slightly lower with
17
18 76 39% of the population failing to meet the aerobic PA guidelines between 2019 and
19
20 77 2020,[6] 27% of which were classed as physically inactive, meaning they did less than 30
21
22 78 minutes of moderate PA a week.[6] Additionally, 43% of UK adults achieved the strength
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24 79 PA guidelines between 2020-2121, which was a 1.2% decrease from the previous year.[6]
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26 80 Whilst there are greater health benefits by reaching the recommended PA levels for most
27
28 81 individuals, it is still beneficial to health to do even small amounts of PA for those who are
29
30 82 inactive or limited by chronic health conditions and then gradually increase levels over
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32 83 time.[4] With physical inactivity leading to 1.6 million deaths annually, and non-
33
34 84 communicable diseases (NCDs) increasing,[7] global strategies promoting health and
35
36 85 wellbeing need greater attention to ensure world health goals are achieved. In 2015, the
37
38 86 United Nations agreed to promote healthy lives and well-being for all ages, as part of the
39
40 87 Sustainable Development Goal 3, which has many health targets, including reducing
41
42 88 premature mortality from NCDs by one third.[8] In accordance with this, the WHO
43
44 89 launched the Global Action Plan on Physical Activity (GAPPA) in 2018 to reduce physical
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46 90 inactivity by 15%.[9] A major barrier to these goals being achieved was the COVID-19
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48 91 global pandemic and associated restrictions, which led to more people working from
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3 92 home and to the temporary closure of gyms and sports facilities, further decreasing PA
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5 93 levels in the UK population.[10] This has resulted in decreased physical and functional
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8 94 capacity, increased mental distress and an increased cardiovascular disease risk
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10 95 profile.[11] Therefore, now more than ever, public health policies and strategies to
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12 96 increase PA levels of the population safely require urgent attention.[10]
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15
16 97 The CMO identified HCPs as key conduits in the promotion of PA.[3] Physiotherapists are
17
18 98 found across multiple clinical areas and are seen as experts in non-invasive management
19
20 99 strategies; they are ideally placed to deliver PA guidance.[12] Physiotherapists reported
21
22 100 that health promotion, especially PA, was within their scope of practice (SOP).[13] Yet, in
23
24 101 a 2016 survey of 514 UK physiotherapists, only 16% knew all three components of the
25
26 102 CMO PA guidelines, despite 77% reporting that they discussed PA with patients.[14] Of
27
28 103 this sample, 12 completed follow up interviews where reported barriers to PA promotion
29
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31 104 included patient complexity , work culture and a lack of time.[15] The authors also
32
33 105 reported some facilitators to health promotion, such as having repeated appointments,
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35 106 collaborations with other services and building an alliance with the patient.[15]
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40 107 Solutions to successfully deliver PA guidance have yet to be explored in depth [15,16],
41
42 108 particularly in the UK. Appropriate solutions are key for policy development, HCP
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44 109 awareness of PA guidelines and also behaviour change in physiotherapy management
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46 110 of patients. As knowledge of the PA guidelines has been previously identified as poor
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48 111 amongst UK physiotherapists prior to the updated CMO and WHO PA guidelines [14], it
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50 112 is yet unknown whether knowledge and awareness of the PA guidelines has improved.
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3 113 The aims of this present study were to explore the current knowledge physiotherapists
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5 114 have of the PA guidelines and promotion of PA, recognise common barriers experienced
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8 115 by physiotherapists when delivering PA advice and identify physiotherapists' perceptions
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10 116 of solutions to support successful delivery of PA guidance.

117 **METHODS**

118 **Design**

119 An interpretivist qualitative approach was taken in this study using semi-structured
120 interviews to explore the knowledge and perceptions towards providing PA advice to
121 patients, amongst a range of UK based physiotherapists. The research approach used in
122 this study has previously be used by other authors and provided informative accounts for
123 HCPs perceptions towards providing PA advice in healthcare.[17] The standards for
124 reporting qualitative research was followed throughout.[18] Ethical approval was granted
125 by the Faculty of Biological Sciences at the University of Leeds (27 July 2020/ BIOSCI
126 19-039).

127 **Participants and procedures**

128 The inclusion criteria for this study included UK based physiotherapists who currently
129 practised and managed National Health Service patients, from any clinical field.
130 Participants were recruited through advertisement on the Musculoskeletal bulletin on the
131 interactive Chartered Society of Physiotherapy (iCSP) portal as well as through LinkedIn
132 and by word of mouth. The advertisement for this study informed prospective participants
133 that it was exploring physiotherapists' knowledge and promotion of PA to patients. Willing

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3 134 participants followed a link to Microsoft Forms, where they viewed the participant
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5 135 information sheet and completed an eligibility survey that included questions on the
6
7 136 inclusion criteria. Eligible participants were emailed the participant information sheet to
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10 137 keep, containing details of what the study involved and a consent form, which was signed
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12 138 by the participants and returned, then an interview date was arranged. Participants were
13
14 139 informed that they could withdraw from this study at any point and this was reiterated at
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17 140 the start and end of the interview. The recruitment and interview process continued until
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19 141 data saturation was reached, when there were no more emerging themes or new
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22 142 responses.[19]

23 24 25 143 **Patient and public involvement**

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27
28 144 None.

29 30 31 145 **Data collection**

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35 146 Interviews adopted a semi-structured design, which is a common method in healthcare
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37 147 research [20], to encourage open ended responses that could be elaborated on with
38
39 148 probing for the limited responses, which explores participants' thoughts and beliefs.[21]
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41
42 149 The interview guide was created by Vishnubala et al. [22] and adapted to make questions
43
44 150 specific to physiotherapists (see Supplementary file). The guide included 30 interview
45
46 151 questions, split into five sections: 1) demographics; 2) PA knowledge and education; 3)
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48 152 resources and interventions; 4) COVID-19; and 5) other, providing an opportunity for the
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51 153 participants to express any other thoughts or ideas. Not all data collected from the
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53 154 interview questions were analysed as they addressed aspects beyond the aims of this
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56 155 paper.[22] All interviews were conducted through the Zoom meeting platform by the lead

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3 156 researcher AS. DV provided training to AS and a mock interview was performed to refine
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5 157 the interview technique and reduce any researcher influence emerging in the delivery of
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8 158 the interview questions. Follow up calls between AS, DV and CN reflected on the data
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10 159 collection of the initial few interviews to make sure they captured rich and informative
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12 160 data. The interviews took place from March 2021 until May 2021 and were audio
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14 161 recorded. Interviews were automatically transcribed verbatim the same day by Zoom,
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16 162 checked for accuracy by the main researcher and stored securely on the University of
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18 163 Leeds OneDrive. Each participant was assigned a participant number, with any
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20 164 identifiable information anonymised.
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25 165 **Data analysis**

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28 166 An inductive thematic analysis approach following Braun and Clarke's six steps was
29
30 167 undertaken: data familiarisation; coding; theme identification; revision of themes; defining
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32 168 and naming themes; and writing up.[23] This method was chosen for its flexibility, whilst
33
34 169 providing in-depth complex data.[24] Interviews were transcribed verbatim and then read
35
36 170 through. Interesting features of the transcript were identified and assigned a code, which
37
38 171 were transferred into a Word document for purposes of organising and supporting the
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40 172 analyses. All interesting features in the data or codes were collated from the interview
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42 173 questions in a separate document, analysed for any common themes from all responses
43
44 174 and reviewed for consistency by the lead researcher. Once the themes were initially
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46 175 established, all steps involved in the analyses were documented, reflected on and
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48 176 repeated by the main researcher, then reviewed at each stage with members of the
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50 177 research team (CN and DV). Prior to the main analyses a pilot analysis was undertaken
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52 178 separately by AS and CN on two interview transcripts in order to confirm consistency in
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179 the interpretation of codes and reflect on emerging themes and to ensure that
 180 transcriptions represented participant responses and to reduce the likelihood of
 181 researcher bias.[24,25]

182 Regarding demographic data, IBM SPSS statistics V.27 was used to describe participant
 183 characteristics, including gender, level of education, years of experience, healthcare
 184 setting and UK region, which were presented as proportions and frequencies. The
 185 number of years of experience were categorised into 0-5 years, 6-10, 11-15, 16-20, and
 186 >21 years. Locations of work were grouped into UK regions. Example quotes from
 187 transcripts were presented in tables for each theme.

188 RESULTS

189 Participant characteristics

190 Twenty-one participants completed the eligibility survey, though one participant did not
 191 meet the inclusion criteria and a further two failed to return the consent form. Data
 192 saturation was reached following 18 interviews and therefore no further participants were
 193 recruited. Interview length ranged from between 35 to 72 minutes. Demographics can be
 194 seen in Table 1. The sample consisted of physiotherapists across six different regions,
 195 with 67% female and 61% working in outpatient settings. Fifty percent of the sample had
 196 less than five years of experience and 56% had either a postgraduate diploma or a
 197 masters level qualification.

198 ***Table 1. Participant characteristics of 18 physiotherapists***

Characteristic	Category	n (%)
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	Gender	Male	6 (33.3)
		Female	12 (66.7)
	Level of education	BSc or equivalent	8 (44.4)
		BSc + postgraduate diploma	3 (16.7)
		BSc + MSc	7 (38.9)
	Years of experience	0-5	9 (50)
		6-10	6 (33.3)
		11-15	0 (0.0)
		16-20	2 (11.1)
		21+	1 (5.6)
	Healthcare setting	Inpatients	5 (27.8)
		Outpatients	11 (61.1)
		Both	2 (11.1)
	UK region	West Midlands	3 (16.7)
		East Midlands	8 (44.4)
		Yorkshire and Humber	4 (22.2)
		North West	1 (5.6)
		London	1 (5.6)
		Scotland	1 (5.6)

BSc, Bachelor of science; MSc, Master of Science; n, number; UK, United Kingdom.

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Thematic themes

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3 202 Following thematic analysis, five themes were identified and split into barriers and
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5 203 solutions to promoting and delivering PA guidance: physiotherapy intrinsic barriers; lack
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7 204 of emphasis and priority given to PA; patient barriers to delivering PA; increasing
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9 205 awareness of the PA guidelines; and optimising the delivery of PA. Amongst the five
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11 206 themes, 16 sub-themes were also identified from the interview transcripts. .
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15 207 **Barriers**

16 208 Theme 1: physiotherapy intrinsic barriers

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19 209 In relation to the CMO PA guidelines, 22% of physiotherapists correctly stated the three
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21 210 components of the guidelines (150 minutes of moderate or 75 minutes of vigorous
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23 211 intensity aerobic activity and twice weekly strength training), whilst 39% did not know any
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25 212 of the components of the PA guidelines. Vigorous intensity PA was the most incorrectly
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27 213 answered or unknown component, followed by the strength recommendations. Many of
28
29 214 the physiotherapists admitted that they had a lack of knowledge of the PA guidelines, with
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31 215 some stating they had either not heard of or read the UK CMO PA guidelines, would not
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33 216 know where to find them and had also not seen any of the accompanying resources, such
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35 217 as infographics. Other emerging barriers were that the physiotherapists expressed low
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37 218 confidence and fear of giving PA advice, in case they gave incorrect advice, or something
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39 219 went wrong as a result of this dissemination (Table 2).
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220 **Table 2. Physiotherapy intrinsic barriers to delivering PA advice with two sub-themes identified through 18**
221 **interviews of physiotherapists**

Sub-theme	Example quotes
Perceived lack of knowledge of the PA guidelines	<p data-bbox="514 454 1890 527">“I guess my lack of knowledge of the exact parameters that we should be advising. So, I think because I'm not 100% sure how many minutes I should be giving, I don't want to advise patients wrongly.” P1</p> <p data-bbox="514 552 1890 698">“My lack of knowledge in terms of not being up to date with what needs to be done in certain cases. Like, if it's like chronic low back pain or diabetes, or some such diseases, I know what to do, but if there's something beyond this which I haven't read or talked about or it's a more complicated presentation, this is what kind of keeps me a bit apart for not giving that advice.” P8</p>
Confidence/ fear of giving PA advice	<p data-bbox="514 730 1890 803">“I think there is a bit of fear of giving the wrong advice and getting penalised for that and also kind of an anxiety is if you've given some advice and it hasn't helped, will you be held accountable?” P7</p> <p data-bbox="514 828 1890 974">“We know physiotherapy as an intervention doesn't have too many risks associated and certainly not severe ones like other interventions, but I think when we prescribe exercises that tends to be maybe one of the more risky things we do. And so yes, I'd probably say the fear associated with what if it goes wrong, and I think maybe a lack of support from, whether it's the company in terms of training or support.” P18</p>

222 n, number of participants; PA, physical activity.

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4 223 Theme 2: lack of emphasis and priority given to PA
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7 224 There were multiple barriers that focused on lack of emphasis and priority given to
8
9 225 promoting PA, identified by the physiotherapists (Table 3). These included many
10
11 226 expressing that they received minimal training on PA, both at university and through
12
13 227 continuing professional development (CPD) offered at work. Time was a common barrier
14
15 228 and issue amongst those interviewed, often because of multiple tasks required within an
16
17 229 appointment that were considered a greater priority. Staffing shortages, pressures for
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19 230 quick discharges and work cultures that deprioritises education and advice over other
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21 231 treatments such as manual therapy, were other less common but important barriers
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24 232 mentioned by some participants.
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233 **Table 3. Lack of emphasis and priority given to delivering PA advice and three sub-themes identified through 18**
 234 **interviews of physiotherapists**

Sub-theme	Example quotes
Lack of CPD training at work	<p>"We have not had any postgraduate or sort of say with, you know, in house extensive training around physical activity, just more something that we touch on. That is if we're looking at you know management of low back pain, we might then say, but physical activity, e.g. walking, is important but there won't be much depth behind physical activity as a topic." P18</p> <p>"Since graduating, I don't think that I've had any specific further training on specific like recommendations for physical activity." P14</p> <p>"I wouldn't say I've had that much specifically about exercise while I've been working" P10</p>
Lack of emphasis through training at university level	<p>"So, I guess the university BSc course I did there was some sort of exercise prescription, strength and conditioning type tutoring, but I think it was one or two lectures and tutorials so it made up of a small part of kind of the course and our studies." P13</p> <p>"I think, would probably fairly minimal training undergrad because it was quite long ago I trained." P16</p> <p>"So we've obviously done a bit on health promotion and health activity in university. There was probably a lecture or two on it. There was also an optional module which I opted not to take." P9</p> <p>"In terms of my physiotherapy training specifically, I've not had much specific training on physical activity. I would say that my training around is probably very limited in terms of from university I don't think they touched on it that much he was on a very brief." P5</p>
Time pressures	<p>"If you have someone coming in to see you with a specific condition, so if it is pain or with an injury or whether it is acute or long term, you are going to have to go through that, assess it before your objective assessment, provide them with advice and specific exercises for that condition. Write the notes, get them booked in, write out the exercises, whatever it is. And if you want to give that advice on top of that, you just don't have time, so if you've got</p>

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4 someone coming to a specific condition that's going to take priority over general lifestyle advice, even if we feel as
5 though that they may really benefit from that, so time is a huge factor." P6

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7 "It also might be that you just don't have the time to do it and give that advice, because you're under so much
8 pressure from your patient caseload and so time is definitely a barrier." P7

9 235 n, number; PA, physical activity, CPD, continuing professional development.

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3 236 Theme 3: patient barriers to delivering PA
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6 237 Another commonly reported theme amongst physiotherapists was patient limitations to
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8 238 delivering PA advice (Table 4). This included physiotherapists reporting that patients often
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11 239 had low compliance to home management, particularly with exercise. Patient fear of doing
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13 240 PA, in case of reinjury or exacerbation of symptoms, was also a reoccurring perception
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15 241 by physiotherapist, particularly for patients who had chronic conditions, with low PA
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17 242 levels. Another common barrier was patient expectations of physiotherapy management,
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19 243 which would often not align with exercise or PA advice, with many reporting that patients
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21 244 would prefer quick fixes and passive treatments such as massage.
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245 **Table 4. Patient barriers to delivering PA and three sub-themes identified through 18 physiotherapist interviews**

Sub-theme	Example quotes
Patient compliance	<p data-bbox="447 394 1927 565">“Sometimes your patients just don't want to do it, they won't have any of it. I think there's a mixture of reasons that you can't really just pinpoint to on certain factors that affects just how you might deliver physical activity advice kind of thing, because sometimes patients are just not on board and with behaviour modification. With behaviour motivational interviewing, you definitely need them to have some sort of interest before actually trying to then even try doing anything really because if they are not on board, they are not going to do it when you tell them.” P9</p> <p data-bbox="447 597 1927 695">“I guess sometimes maybe the compliance. Again, I'm just thinking about the demographic of some patients that I see, they may find it quite hard to change the amount of physical activity or find that it's not something that they're necessarily prioritising or too willing to do so maybe that behaviour change element.” P18</p>
Patient fear of exercise	<p data-bbox="447 771 1938 836">“Kind of what I've experienced a lot recently is people that have come in with say like pain or you know, like crepitus in the knee. And quite fearful of movement and quite fearful of exercise and kind of have that fear avoidance.” P4</p> <p data-bbox="447 868 1896 938">“Quite often, in regards of exercise as well, any physical activity is a fear avoidance, patients are just afraid to do and make things worse.” P3</p>
Expectations of physiotherapy	<p data-bbox="447 1015 1938 1112">“Patient expectations of a physio appointment. So, if they're just wanting manual therapy, for example, and we're chewing their ear off about walking more and keeping themselves active and moving or trying to encourage them to pick up a new hobby if they are pretty sedentary, then that could be a barrier as well.” P18</p> <p data-bbox="447 1144 1896 1279">“We see a lot of chronic pain patients who are looking for a quick fix. And they might turn towards medications or massage or other passive interventions, which actually I try and use the analogy to patients around chronic pain that it's not a machine that can be fixed or should be fixed, but instead of garden that we should try and tend to regularly and, and then that way we may have better success at keeping on top of chronic pain.” P18</p>

246 n, number of participants; PA, physical activity.

247 **Solutions**

248 Solutions and successful approaches to managing patients with chronic and acute
249 conditions were discussed in the interview, in addition to their opinions on the most
250 efficient and effective ways to communicate the PA guidelines.

251 Theme 4: increasing awareness of the PA guidelines

252 A key theme identified from physiotherapists in response to successfully promoting PA to
253 patients was to increase awareness of the PA guidelines to both patients and
254 physiotherapists (Table 5). Most responses included improving staff training with some
255 suggesting it should be a mandatory annual module and others proposing having more
256 group discussions between staff on PA and its benefits. Awareness of local initiatives and
257 exercise referral schemes (ERS) to enable signposting was also recommended as a
258 solution, particularly for those with time constraints and to support the patients more long-
259 term. Social media was mentioned on multiple occasions as a solution to both increasing
260 awareness of PA and PA opportunities for the general public and physiotherapists alike,
261 such as Twitter or LinkedIn, by following influential people in the field and listening to
262 podcasts. Social media was specifically recommended as a useful tool to raise awareness
263 to the younger populations and those who regularly use technology, though, for
264 populations less suited to social media many physiotherapists suggested television
265 advertisement to engage more people and spread awareness of the PA guidelines.

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266 **Table 5. Increasing awareness of the PA guidelines as a solution to delivering PA advice with four sub-themes**
 267 **identified through 18 physiotherapist interviews**

Sub-theme	Example quotes
Staff training	<p data-bbox="390 448 1959 480"><i>"I think better ongoing potentially mandatory training or better kind of educational pieces that go out across the board." P2</i></p> <p data-bbox="390 516 1959 610"><i>"If we do it as a yearly in-service training, just as a refresher, it makes it more accessible, because if someone's a bit embarrassed or they don't want to ask when they feel they should know, but they don't know where to know, if you do it as a training for the whole team then that's not targeting anyone, but it is very informative." P7</i></p>
Use of campaigns through television and advertising	<p data-bbox="390 699 1959 829"><i>"I think TV ads would be quite useful. Often when I'm prescribing exercises to patients that are very sedentary, I use the advert break, as an example of when they could get up change their posture, move around. Do something, do their exercises if they so desire. So having an actual maybe government led advertisement, because the people that are going to see that are the ones that have sat all day in front of the TV." P1</i></p> <p data-bbox="390 862 1959 927"><i>"Kind of just campaigning that everybody should be doing, you know even just like adverts on TV, you know, like so it's kind of in people's faces a bit more frequently and every day." P11</i></p>
Use of social media	<p data-bbox="390 1000 1959 1065"><i>"If you want to get the younger ones you need to go social media, you need to get your Tik Tok influences, you need to get your instagramers." P17</i></p> <p data-bbox="390 1097 1959 1196"><i>"Social media is the only way forward I think at the minute and it's difficult because obviously you do want to target the older generation as well, however, like I said before, culture change takes such a long time that I think the main way to get it across to people nowadays is through social media and get that to filter down through the next generations" P12</i></p>

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Signposting
to other
exercise
services

"I think we're quite lucky particularly in Sheffield in that we've got sort of for those patients who we know are safe and obviously are happy to do activity we've got a lot of referral schemes, so we've basically got like SPARS [Sheffield Physical Activity Scheme] access which has got physical activity guidance, and so we can actually send them through to health trainers. So they give again further guidance on exercise obviously dieting and things like that." P5

"So, one of the ways I think was having further links with like community, like gyms or, like other outdoor spaces. They could yeah link in with that you can like continue the programme after it's like just a clinical referral and, like the six weeks, whatever and then after that the physical activity should carry on." P14

268 n, number; PA, physical activity.

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3 269 Theme 5: optimising the delivery of PA
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6 270 Successful approaches were discussed in terms of delivering PA advice to patients with
7
8 271 chronic and acute conditions and how promotion can be optimised (Table 6). With patient
9
10 272 barriers in mind, many participants suggested ensuring any PA prescription should be
11
12 273 individualised, functional and based on what the patient enjoys. Many also reported
13
14 274 communication as a key factor and that the language used should not be patronising,
15
16 275 forceful or lack empathy, which echoed the advice physiotherapists would give towards
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18 276 encouraging less enthusiastic colleagues to promote PA. To facilitate discussions and
19
20 277 support patients, visual resources, such as infographics, were advocated; some
21
22 278 suggested giving them to patients after an appointment or displaying them in waiting
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24 279 rooms and toilets. Other visual resources, such as leaflets and handouts, were also
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26 280 mentioned.
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281 **Table 6. Optimising delivery of PA advice with five subthemes identified through 18 physiotherapist interviews**

Sub-theme	Example quotes
Make PA individualised and functional	<p data-bbox="426 435 1835 500"><i>“Get to know them as an individual, so ask them their current hobbies and the types of activities that they are interested in. So that I can tailor the activity to their needs and something that I think they are likely to do.” P1</i></p> <p data-bbox="426 532 1902 634"><i>“I think for anyone who's maybe going to increase their physical activity, I'd have given them advice to sort of take their time with it, just ease themselves in and find something they enjoy and that's regardless of chronic conditions and or anything really.” P13</i></p>
Have gradual approach to introducing PA	<p data-bbox="426 727 1923 824"><i>“If someone's got a long-term condition, it might be more of a structured manner, so I might start off really small and then, catch up with them, see how they responded to it and then incremental it up and just progress things on a lot slower.” P6</i></p> <p data-bbox="426 857 1934 959"><i>“If they have had pain a long time, I would probably want to at least begin at a low manageable intensity or volume, and then have that graded exposure to it, so gradually building things up as to, so they can not only build confidence, but they're able to manage it without having regular flareups.” P18</i></p>
Supportive communication	<p data-bbox="426 1019 1934 1182"><i>“I think appreciating where patients are. So, kind of sympathising with the fact that they're in pain, in particular for chronic patients with chronic problems. You know I hear a lot that people don't listen, believe me, they think I'm putting it on, or they think I should be able to do more and I think just understanding and sympathising is a really good starting point, because I think once people feel listened to, then they're more likely to take on board the advice of education that you can offer them.” P16</i></p> <p data-bbox="426 1214 1934 1375"><i>“The biggest thing I've learned is to not ram it down their throat and try and come across you know better because, it just really pisses people off, but, in terms of trying to just say this is what you could be doing, how much of that do you think you could manage which sounds like it's doable for you and kind of go from there, it seems to work quite reasonably well.” P15</i></p>

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"I'd say if I have to pick one, I would go for the government infographics just because they've got the information that you can print out and stick up. So, you've got everything you need and is not in depth and it's obviously patient friendly as well, so it is simple, for everyone, and everyone can understand it, so I'd probably say that's the best resource, in my opinion." P5

Use of visual resources

"Infographics, so if you've got certain clinicians who are visual learners, let's say, using things like that they might be ones that they can print off, put up in their clinic rooms I've seen that before and facilitates that discussion with the patient." P18

282 n, number; PA, physical activity

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283 **DISCUSSION**

284 The aims of this study were to provide a greater insight into UK physiotherapists' possible
285 current levels of PA knowledge and identify the main barriers and solutions perceived to
286 delivering PA guidance. This study specifically, found that few physiotherapists knew the
287 UK CMO PA guidelines, despite being updated in 2019 and identifying HCPs including
288 physiotherapists, as key to disseminating the guidelines.[3] Further, very few participant
289 knew where to access the PA guidelines and associated infographics. Common barriers
290 found included: lack of time, low confidence, limited PA training at university and through
291 CPD once qualified, in addition to patient expectations, compliance and fear of exercise.
292 Solutions, separated into increasing awareness of the PA guidelines and optimising
293 delivery of the PA guidelines, consisted of using television advertisement campaigns and
294 social media to spread awareness; increased staff training; signposting to local services;
295 following individualised and gradual approaches for patients with chronic conditions;
296 having good communication; and use of visual resources, such as infographics, to
297 facilitate the PA advice given by physiotherapists.

298 **Barriers**

299 Physiotherapy knowledge and intrinsic factors

300 Having knowledge and awareness of the PA guidelines is an important factor in being
301 able to successfully promote PA. Around 22% of participants correctly identified moderate
302 and vigorous intensity aerobic activity and strength recommendations in this study. This
303 was only slightly higher than that found in previous research where 16% of 514 UK

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3 304 physiotherapists correctly identified all three components.[14] Whilst this study only had
4
5 305 18 participants, making true comparisons difficult, the findings might suggest that the
6
7 306 2019 updated CMO PA guidelines have had little impact on the knowledge or awareness
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10 307 of physiotherapists. However, it appears reduced knowledge of PA is not limited to UK
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12 308 physiotherapists, as Yona et al. [26] found that of 1062 Israeli physiotherapists who took
13
14 309 part in a survey in 2018, 87% reported awareness of PA guidelines, yet only 6.8%
15
16 310 correctly stated all three components with vigorous intensity PA and strength being most
17
18 311 commonly incorrectly stated, similar to the present study. This may be due to
19
20 312 physiotherapists feeling more confident recommending moderate intensity PA,
21
22 313 particularly for more complex patients typically with comorbidities such as cancer, heart
23
24 314 or respiratory conditions, and therefore, less aware of the other recommendations.
25
26 315 Awareness of the guidelines and where to locate them were clear issues in this present
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28 316 study, with many not knowing where to find the CMO PA guidelines, which questions the
29
30 317 effectiveness of the communication strategy when the guidelines were updated in 2019.
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32 318 Limited awareness of the CMO PA guidelines was also recently reported by Vishnubala
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34 319 et al. in their qualitative study of 15 GPs.[22] Another larger study in 2016 of 1,013 GPs
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36 320 found that 30% had never heard of the CMO PA guidelines and a further 50% had heard
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38 321 of them but were very unfamiliar.[27] Arguably, the lack of awareness of the CMO PA
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40 322 guidelines could be a result of HCPs using alternative PA guidelines, with some
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42 323 participants in this study reporting using the WHO guidelines. Nevertheless, the
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44 324 recommendations from the different guidelines are very similar and thus does not justify
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46 325 limited knowledge of the key components of the CMO PA guidelines.
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3 326 Fears of litigation are prevalent in healthcare, which can prevent HCPs from delivering
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5 327 some treatments. De Vivo and Mills identified fear and a perception of vulnerability as a
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7 328 barrier experienced by 10 midwives who gave PA advice to pregnant patients,[28] which
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10 329 was also reported by nurses and GPs who managed diabetic patients, leading to
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12 330 disengagement in PA advice.[17] This is especially important when patients can both
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14 331 benefit from increasing their PA and also present with a readiness to change their PA
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16 332 status. Further, Lowe et al. highlighted that PA discussions were more difficult with
17
18 333 complex patients.[15] A survey of 7,026 GPs in 2012, found that many would practise
19
20 334 defensively, particularly for high-risk patients due to the impact of complaints.[29] This
21
22 335 perceived risk, could be attributed to lack of knowledge of how to adapt PA to the patient's
23
24 336 needs leading to reduced confidence giving the advice. Yet, many physiotherapists in this
25
26 337 present study were at least fairly confident giving PA advice, which may be due to
27
28 338 physiotherapists seeing health promotion as part of their SOP and that they have the
29
30 339 skills to engage the patients into changing their lifestyle by basing PA advice on
31
32 340 experience rather than specific guidelines. Indeed, physiotherapists have at least some
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34 341 confidence in providing basic PA advice, though are possibly more fearful with complex
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36 342 patients due to the increased risks.
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43 343 Lack of emphasis and priority

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46 344 Lack of emphasis and priority placed on PA is another barrier faced by physiotherapists
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48 345 in this study. Although HCPs are identified as being key to PA promotion in the CMO
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50 346 guidelines, the time pressures during assessments are a frequent challenge for many
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52 347 physiotherapists, with time being the most cited barrier by 22 UK inpatient
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54 348 physiotherapists during focus groups.[13] Time pressures during appointments have an
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3 349 impact on the ability to give advice, leading to prioritisation of tasks and mean significantly
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5 350 less lifestyle advice is provided.[30] Furthermore, perceptions that PA advice is a low
6
7 351 priority needs to be changed. In part, this would require training and a greater emphasis
8
9 352 on the dissemination of PA guidance by HCPs. A lack of training on PA by HCPs is not
10
11 353 uncommon [17], despite over half of the physiotherapists in this study completing a
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13 354 postgraduate diploma or master's degree many reported inadequate training on PA,
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15 355 questioning the integration of health promotion in the curriculum. Yet, physiotherapy
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17 356 students who took part in focus groups, reported receiving academic public health training
18
19 357 and reported completing public health qualifications whilst at university.[31] This suggests
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21 358 that while public health topics are being taught at university, a possible lack of emphasis
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23 359 and importance placed on PA and how to promote PA effectively, is leading to the
24
25 360 knowledge not being sustained. A lack of emphasis on training on PA promotion seems
26
27 361 to be an issue that continues post qualification with 55% of GPs reporting not receiving
28
29 362 any CPD on PA since leaving university [27]. It also raises questions if training and
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31 363 education that has been provided through recent initiatives such as the Public Health
32
33 364 England Clinical PA Champions programme has been accessed and subsequently used
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35 365 to the full effect.

366 Patient barriers

367 Patient barriers for taking up PA advice can heavily impact on clinical outcomes if not
368 identified and addressed. The perception of low patient compliance was a re-emerging
369 barrier in this study, which reflected previous findings where 24% of Australian
370 physiotherapists agreed PA advice would not change a patient's behaviour.[32] Whilst
371 this perception of low compliance may be warranted in some cases and based on

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3 372 experiences, it may also be that exercises and PA prescribed are not meeting the needs
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5 373 of the patient. Indeed, UK based Pakistani women identified that exercise based
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7 374 management did not meet cultural needs, leading to poor compliance.[33] Patient
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10 375 demographics can also influence compliance, with smokers and the elderly less likely to
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12 376 change their PA levels.[34] Moreover, this may feedback to low confidence of
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14 377 physiotherapists in modifying advice to tailor approaches that are socio-culturally
15
16 378 meaningful to individuals from diverse backgrounds. Additionally, patient expectations of
17
18 379 physiotherapy can contribute to poor compliance, with some patients more reliant on
19
20 380 passive treatments such as massage compared to active treatments such as
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22 381 exercise,[35] which was highlighted as a barrier in this study. Regardless of expectations,
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24 382 patient fear can affect compliance, often as a result of exercise misconceptions, poor
25
26 383 clinician communication or negative past experiences, leading to the perception that PA
27
28 384 is harmful and causing fear avoidance.[36,37] Fear avoidance of PA, particularly with
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30 385 chronic musculoskeletal conditions, can impact on clinical outcomes and rehabilitation if
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32 386 not addressed.[38] Patient barriers should not be overlooked when promoting PA and
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34 387 therefore strategies to optimise compliance, reduce fear and manage expectations are
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36 388 vital for succeeding in behaviour change.
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43 389 **Solutions**

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46 390 Increasing awareness of the PA guidelines

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49 391 Increasing awareness of the PA guidelines to both patients and physiotherapists was one
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51 392 solution identified in this study. Indeed, with inadequate training reported, there is a need
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53 393 for improvements in undergraduate and staff training, an opinion also expressed by other
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3 394 HCPs.[22,17] A possible explanation for this is that many physiotherapists often
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5 395 incorporate exercise prescription into a patient's management plan and so feel they
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7 396 already have the skills to deliver PA advice to some extent.[39] Nevertheless, with limited
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10 397 knowledge of the CMO PA guidelines, staff training would benefit physiotherapists giving
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12 398 them confidence in discussing PA with any patient. Awareness of local services and ERS
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14 399 available to facilitate signposting can also support physiotherapists that lack confidence
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16 400 providing specific PA guidance. In addition, the importance of having PA resources and
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18 401 information in one consolidated place is also important in this respect.[17] To improve
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20 402 adherence, exercise professionals have suggested that HCPs should understand the
21
22 403 schemes they signpost to, so that they are not used as a last resort and ensure the patient
23
24 404 is motivated to participate.[40] Signposting appears to be an effective solution to PA
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26 405 promotion, though this requires the availability of schemes, and awareness and
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28 406 understanding for HCPs to appropriately refer patients to these services.[17]
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34 407 Optimising delivery

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37 408 Optimising the delivery of PA guidance is essential for patient understanding, compliance
38
39 409 and subsequent clinical outcomes. Graded exposure to PA for those who are fearful or
40
41 410 deconditioned was one of the proposed successful approaches to delivering PA guidance
42
43 411 in this study and has previously been reported as an effective sustainable approach to
44
45 412 prescribing exercise,[38] whilst still offsetting the adverse effects that being inactive can
46
47 413 cause.[41] Making PA individualised, with consideration of patient preferences to build
48
49 414 confidence is more favourable by patients.[42] This person centred approach, in addition
50
51 415 to goal setting and self-monitoring, has been found to be an effective behavioural change
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53 416 technique, leading to long term change in PA levels.[43] Moreover, use of other
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3 417 behavioural therapies, such as acceptance and commitment therapies (ACT), which were
4
5 418 developed from cognitive behavioural therapy (CBT) can be used to direct development
6
7 419 of interventions to sustain long term behaviour change and compliance to PA.[44]
8
9
10 420 Additionally, good communication has been found to be crucial to challenge the
11
12 421 misconceptions leading to poor compliance, especially in patients with chronic conditions
13
14 422 where pacing is advised,[36] whereas forceful or patronising language discouraged
15
16 423 patients from communicating their concerns.[45] Furthermore, there are multiple factors
17
18 424 that can influence a patient's response to PA advice and therefore, the approach taken
19
20 425 and language used is vital for successful changes in behaviour and thus needs to be
21
22 426 carefully considered by HCPs.
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27 427 To further facilitate discussions, visual resources, such as leaflets, have also been
28
29 428 suggested to reinforce advice given to patients.[22] HCPs have previously reported
30
31 429 leaflets as a convenient concise way to help focus information during a consultation and
32
33 430 more convenient than using websites.[17] Freene et al. found that 93% of an Australian
34
35 431 physiotherapy sample also agreed having resources would be useful for promoting
36
37 432 PA.[32] Leaflets have been found to improve patient satisfaction, communication and
38
39 433 reduced need for reassessments of the same pathology in French emergency
40
41 434 departments.[46] Additionally, infographics have been found to be an effective visual way
42
43 435 to convey complex information on PA, though the effectiveness of influencing health
44
45 436 behaviour change is unknown.[47] In this study some participants reported displaying the
46
47 437 CMO PA infographics in waiting rooms and toilets, which increases exposure to the PA
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49 438 guidelines and may facilitate discussions. However, as the CMO PA infographics are
50
51 439 aimed towards HCPs, consideration is needed to ensure displayed information is not too
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3 440 complex to meet the needs of patients.[48] Visual resources can assist physiotherapists
4
5 441 in promoting PA and reinforce the message delivered during the appointment, though
6
7 442 must involve patient friendly material.
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10 11 443 **Strengths and limitations**

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13
14 444 To the authors' knowledge, this is the first study to review UK physiotherapists' knowledge
15
16 445 of the updated 2019 CMO PA guidelines and explore, in depth, physiotherapists'
17
18 446 perceived solutions to address the barriers faced when delivering PA guidance. Virtual
19
20 447 interviews conducted using online platforms enabled recruitment of physiotherapists from
21
22 448 all over the country, increasing the representation across different geographical areas.
23
24 449 Additionally, the sample contained a range of clinical expertise and years of experience.
25
26 450 The interview questions enabled flexibility to responses and encouraged reflection of
27
28 451 personal practices on delivering PA advice that could help improve the promotion of PA
29
30 452 guidelines. Moreover, this study highlights the importance of holding dialogue with
31
32 453 physiotherapists when identifying solutions for promoting the CMO guidelines. Limitations
33
34 454 included increased risk of bias due to having a volunteer sample, with those who are more
35
36 455 enthusiastic about PA or have more knowledge on the topic being more likely to
37
38 456 participate. Due to the qualitative methodology, data cannot be generalised to UK
39
40 457 physiotherapists as it is heavily impacted by personal viewpoints and values, however, it
41
42 458 is still insightful towards physiotherapists awareness and application of PA guidelines and
43
44 459 provides a foundation for future research. Moreover, this study provides valuable insights
45
46 460 that inform future intervention design aimed at supporting physiotherapists in this study
47
48 461 to give PA advice. Placing physiotherapists at the heart of these discussions is important
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50 462 in shaping workable solutions aimed at promoting the PA guidelines in routine care.
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3 463 Greater depth in the analysis of themes by comparing the different clinical fields of
4
5 464 physiotherapy would have added value and enable more specific solutions to each clinical
6
7
8 465 field. Finally, although efforts were made to reduce researcher bias by reviewing and
9
10 466 discussing the themes to ensure reliability of interpretations, and through following Braun
11
12 467 and Clarke's six steps, there was still a risk of bias when interpreting the results.
13
14

15 468 **Clinical implications**

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18
19 469 Placing physiotherapists at the heart of discussions is important in shaping workable
20
21 470 solutions aimed at promoting the PA guidelines in routine care and so ongoing dialogue
22
23 471 is important in effective intervention design and delivery aimed at this group of HCPs.
24
25
26 472 Further, as barriers and knowledge appear to be unchanged with time, action is needed
27
28 473 both at university level and through CPD to increase knowledge and awareness of the
29
30 474 PA guidelines. Physiotherapists should accept responsibility of their own development on
31
32 475 PA knowledge and reflect on their current practices, comparing to the optimised
33
34 476 approaches suggested in this study and adapt accordingly, especially for those with
35
36 477 different socio-cultural backgrounds. Following this study, future research needs to
37
38 478 explore any differences in the barriers and solutions to delivering PA advice between
39
40 479 various clinical fields of physiotherapy. Following this, action is needed to begin
41
42 480 implementing the solutions raised, to challenge these persisting barriers and to evaluate
43
44 481 the effectiveness of these solutions in supporting physiotherapists delivering PA advice.
45
46 482 Consideration of behavioural change techniques and use of ACTs can help to guide
47
48 483 development of interventions for either clinicians or patients to improve and sustain PA
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50 484 levels in the population. The continued involvement of physiotherapists started within this
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52 485 study is important in shaping such solutions.
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486 **CONCLUSION**

487 Despite updates to the CMO PA guidelines and previous research highlighting barriers to
488 physiotherapists delivering PA advice, the same barriers including time, inadequate
489 training and low patient compliance remain. Whilst physiotherapists have some
490 confidence delivering PA advice, knowledge of the guidelines was limited. Increasing
491 awareness and optimising delivery of PA were identified as the main solutions to
492 increasing PA promotion, with a greater emphasis needed on PA in training and specific
493 approaches to increase the efficiency of giving PA advice being suggested. These
494 findings can help to facilitate implementation of the solutions and future research should
495 then evaluate the effectiveness of the implemented strategies in supporting PA
496 discussions, to increase the public's PA levels.

497 **Declarations**

498 **Ethics approval and consent to participate**

499 Ethical approval was granted by the Faculty of Biological Sciences at the University of
500 Leeds (27 July 2020/ BIOSCI 19-039). All participants were given a study information
501 sheet and gave informed consent to participate.

502 **Consent for publication**

503 Not applicable.

504 **Data availability statement**

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2
3 505 The datasets generated and analysed during the current study are not publicly available
4
5 506 due to all material used in the analysis being reports and not databases. However,
6
7 507 anonymised interview transcripts are available from the corresponding author on
8
9 508 reasonable request.

13 509 **Competing interests**

16 510 The authors declare that they have no competing interests.

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23 512 This research received no external funding.

26 513 **Authors' contributions**

30 514 AP and DV developed the research question, concept and design, while AI, CN and KM
31
32 515 acted as methodological council. AS led data collection and analysis, supervised by DV
33
34 516 and CN. AS produced a first version of the manuscript. AI, AP, AS, CN, KM and DV
35
36 517 revised the manuscript to bring it to its current version. All authors have read and
37
38 518 approved the final manuscript.

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49 521 **Authors' information (optional)**

52 522

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SUPPLEMENTARY FILE

INTERVIEW GUIDE

[Thank the participant for attending the interview]

[Participant to have read the PIS and consent form, and returned a completed copy of the consent to the researcher prior to the interview]

[Researcher and participant to introduce themselves. Researcher to introduce the evaluation and the purpose of the interview]

[Reiterate that the information participants provide will be anonymised and confidential.
Check that the participant is comfortable with the interview being recorded]

START RECORDING

In this interview I am interested in hearing about your experiences of delivering physical activity (PA) guidance to a patient, your opinion as a clinical expert in PA on the barriers, challenges and solutions to improving health care professionals given PA advice and views on current interventions/developments.

Please be assured that you will remain anonymous and the research team will not share your comments with anyone else, so be as honest as you can. If there are any questions that you would prefer not to answer you do not have to answer them. If at any point you do not understand what I am asking or need some clarification, please feel free to ask as we go along. You will be given an opportunity to say anything that we have not covered at the end of the interview

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3 29
4
5 30 Do you have any questions about the interview before we begin?
6

7 31 **DEMOGRAPHICS and KNOWLEDGE**
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10 32 Q1. State your role, level of study, experience and current location of work (primary or
11
12 33 secondary care)
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15 34 Q1a. What is your speciality/discipline?
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18 35 Q1b. How many years' experience post-graduation do you have?
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22 36 Where work- eg hospital
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25 37 Q1c. Do you know the basic recommendations for physical activity a week?
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28 38 Q2. Which statement best describes your own PA:
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32 39 1. Currently meeting the CMO PA guidelines of 150 mins moderate/75 min vigorous
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34 40 weekly PA or combination of both
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37 41 2. Currently doing some PA 30 mins moderate physical activity (MPA) per week,
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39 42 but not meeting CMO PA guidelines of 150 mins moderate/75 min vigorous weekly PA or
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41 43 combination of both
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44 44 3. Currently doing less than 30 min MPA per week
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48 45 PRIOR TO COVID AND AFTER- why??
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52 46 Q3. Tell me about the education and training that you have received in relation to PA
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3 47 [Education and training during formal medical degree and Continuous Professional
4
5 48 Development; Knowledge of PA guidelines; Feelings/confidence around delivering CMO
6
7
8 49 PA guidance] Under/postgrad
9

10
11 50 Q4. If someone is diagnosed with chronic disease that can be improved by PA, what do
12
13 51 you currently do in terms of delivering PA guidance?
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16
17 52 [Explore who delivers guidance, whether part of standard procedure or ad hoc, whether
18
19 53 content of guidance is general advice or adheres to guidelines; eg motivational interview
20
21

22 54 Q4a. Why this approach;
23

24
25 55 Q4b. What s/he thinks of this approach;
26
27

28
29 56 Q4c. What individuals/practice could do differently?
30
31

32 57 Q4d. What works well and why?
33
34

35 58 Q4e. What needs to change for this to happen?
36
37

38
39 59 Signposting, etc.].
40
41

42 60 Q5. What do you do differently for those who have chronic disease versus those who
43
44 61 don't in terms of the advice you give for PA guidance?
45
46

47
48 62 Q5a. Given an Example;
49

50
51 63 Q5b. What works well and why?
52
53

54 64 Q5c. What works less well?
55
56
57
58
59
60

1
2
3 65 Q6. What would be your 'top tip' for promoting PA to your patients with chronic disease
4
5 66 and those without?
6
7

8
9 67 [Explore what they do well and would share with their fellow colleagues as
10
11 68 something that is exemplar practice]
12
13

14 69 Q7. What would help you to deliver the CMO PA guidelines to your patients? Can make
15
16 a note that they haven't seen it- what can help you deliver the guidance. How should
17 70 training be delivered.
18
19 71
20
21

22 72 Prompts if needed: time, resources, partnerships with providers, better training, other
23
24 73 people I could refer to in house, policy commitment for PA promotion
25
26
27

28 74 Q8. What in your opinion are the challenges and barriers that prevent HCPs giving PA
29
30 75 advice?
31
32

33 76 Prompts here-Consider intrinsic and extrinsic
34
35

36
37 77 Q9. How do you engage hard-to-reach HCPs who are less enthusiastic or even anti PA?
38
39

40 78 Q9a. What works why and how?
41
42

43 79 Q9b. What works less well and why?
44
45

46
47 80 Q10. Should we not bother engaging those HCPs who are less enthusiastic, yes or no
48
49 81 and why?
50
51

52 82 EDUCATION
53
54
55
56
57
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59
60

1
2
3 83 Q11. What education /resources out there for HCPs do you feel is most effective at
4
5 84 enabling us to promote the guidelines?
6
7

8
9 85 [Prompts: The 2019 guidelines Infographics, PA training, Mentoring]
10

11
12 86 What works well and why?
13

14
15 87 What should we do that would help you to see/ access the info.
16

17
18 88 Q12. How can we embed more PA into undergraduate and postgraduate curriculums?
19

20
21 89 Consider delivery type/method, scalability, consider assessment
22
23

24
25 90 Q13. What do you think are the solutions to increase HCP giving PA advice?
26

27
28 91 Consider policy, motivating practices, clinicians
29
30

31 92 RESOURCES AND INTERVENTIONS 32

33 93 2019 Guidelines 34

35
36 94 Q14. Do you think the 2019 update has been helpful or not?
37
38

39
40 95 Q14a. Why is this?
41
42
43

44
45 96 Q15. Have you seen the CMO PA infographics? If so which ones?
46
47

48
49 97 Q15a. If yes- how do you use it?
50
51

52 98 Where would you find it?
53
54

55 99 Q16. What else would you like to see in the guidelines?
56
57
58
59
60

1
2
3 100 [Prompts: 24 hour message, inclusion of guidelines on sleep and PA, specific
4
5 101 diseases, other groups?] anything you'd want adding? Do you think there's any value in
6
7
8 102 adding...

9
10
11 103 Q17. What other action or resources should accompany the implementation of the CMO
12
13 104 PA guidelines?

14
15
16 105 [Prompts: CMO PA Guidelines communication strategy, A campaign with TV,
17
18 106 radio, social media advertising, Better resourcing to support the campaign, Inclusion of
19
20 107 communication experts on different platforms, Coordinated approach with other health
21
22 108 issues]

23
24
25
26
27 109 Q18. Do you use any other PA related guidelines?

28
29
30 110 Yes/No... Why?

31
32
33 111 Moving Medicine (MM)

34
35
36 112 Q19. Do you know about MM? (yes/no)

37
38
39
40 113 MM is an online suite of resources that provide time specific consultations for HCP
41
42 114 across 11 conditions

43
44
45 115 Q20. Do you currently use MM resources? (yes/no)

46
47
48 116 Q20a. If you do use it, how do you use it?

49
50
51
52 117 Q20b. If you don't use it, why not?

53
54
55 118 Q21. What works well and why?

1
2
3 119 [Prompts: Content, coverage, access, style?]
4
5

6 120 Q22. What does not work well and why?
7
8

9
10 121 [Prompts: Content, coverage, access, style?]
11
12

13 122 Q23. In your opinion what could be improved about moving medicine to make it more fit
14

15 123 for your purpose as a clinician?
16
17

18 124 COVID-19
19
20

21
22 125 Q24. Has COVID-19 changed the frequency or way you given PA advice?
23
24

25 126 Q25. If you are giving PA advice during COVID-19 can you give an example of where and
26

27 127 how and why you have given PA advice?
28
29

30
31 128 Q26. Are you currently giving any specific advice to reduce sedentary behaviour during
32

33 129 covid?
34
35

36 130 Q27. Are you targeting any specific groups?
37
38

39 131 Q28. Can you give an example of where you have done this? Eg educating, asking qu's.
40

41 132 do you bring this up in conversation.
42
43

44
45 133 OTHER
46
47

48 134 Q29. What are your thoughts about the current process where rehab typically stops after
49

50
51 135 Band 6?
52
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136 Q30. Is there anything else that you would like to add about delivering PA before we finish
137 or anything you have not said?

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SRQR checklist

	Reporting item	Line number
Title (#1)	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	6-8
Abstract (#2)	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	25-49
Introduction		
Problem formulation (#3)	Description and significance of the problem /phenomenon studied: review of relevant theory and empirical work; problem statement	67-101
Purpose or research question (#4)	Purpose of the study and specific objectives or questions	101-104
Methods		
Qualitative approach and research paradigm (#5)	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed together.	128-151
Researcher characteristics and reflexivity (#6)	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	125-128
Context (#7)	Setting / site and salient contextual factors; rationale	134-136
Sampling strategy (#8)	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	116-124
Ethical issues pertaining to human subjects (#9)	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	110-111, 119-120

Data collection methods (#10)	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	129-138
Data collection instruments and technologies (#11)	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instrument(s) changed over the course of the study	129-138
Units of study (#12)	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	159-168 (results)
Data processing (#13)	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation / deidentification of excerpts	136-139
Data analysis (#14)	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	141-157
Techniques to enhance trustworthiness (#15)	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	146-152
Results/findings		
Syntheses and Interpretation (#16)	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	171-249
Links to empirical data (#17)	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	190-192, 201-203, 213-214, 233-235, 248-249
Discussion		
Intergration with prior work, implications, transferability and contribution(s) to the field (#18)	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	251-376, 395-408
Limitations (#19)	Trustworthiness and limitations of findings	377-394
Other		
Conflicts of interest (#20)	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	439-440

Funding (#21)	Sources of funding and other support; role of funders in data collection, interpretation and reporting	441-442
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UK physiotherapists delivering physical activity advice: what are the challenges and possible solutions? A qualitative study

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ABSTRACT

Objectives: Despite the known health benefits of physical activity (PA), PA levels are in decline. Healthcare professionals (HCPs), including physiotherapists, have been identified as ideal conduits to promote PA, yet their knowledge and awareness of PA guidelines are poor. The aims of this study were to explore current knowledge of PA

24 guidelines among UK physiotherapists and identify barriers and possible solutions to
25 delivering PA advice.

26 **Design:** A qualitative approach using semi-structured interviews that took place between
27 March and May 2021. Data were analysed with a thematic approach using Braun and
28 Clarke's six steps.

29 **Setting:** Various inpatient and outpatient clinical settings across six UK regions.

30 **Participants:** Eighteen UK-based physiotherapists managing National Health Service
31 patients were recruited through volunteer sampling in March 2021.

32 **Results:** Five themes and 16 sub-themes (shown in parenthesis) were identified as
33 barriers and solutions to delivering PA advice: physiotherapist intrinsic barriers
34 (knowledge, fear/confidence); a lack of emphasis and priority given to PA (time
35 constraints, minimal educational and staff training); patient barriers (compliance,
36 expectations, and fear of doing PA); increasing awareness of the PA guidelines (staff
37 training, signposting awareness, use of social media and television campaigns); and
38 optimising delivery (use of visual resources, good communication and approaches
39 involving being individualised and gradual for patients with chronic conditions).

40 **Conclusions:** In this study, physiotherapist participants seemed to have limited
41 awareness of the PA guidelines despite recent updates and were faced with similar
42 barriers to those previously reported in the literature. The solutions suggested could guide
43 strategies to support physiotherapists being able to deliver PA advice. Further research

1
2
3 44 is needed to evaluate the efficiency of any implemented solutions supporting the delivery
4
5 45 of PA advice.
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9 46

10
11 47 **Keywords:** Physical activity, physiotherapists, knowledge, awareness, advice
12
13 48

14 15 49 **Strengths and limitations of this study**

- 16
17
18 50 • This study identified physiotherapists' barriers to providing physical activity (PA)
19
20 51 advice but also identified possible solutions informed by these key stakeholders.
21
22
23 52 • The qualitative design and use of semi-structured interviews enabled flexible
24
25 53 discussions to capture the thoughts and opinions of the participants and to
26
27 54 ensure responses could be explored further in future research.
28
29
30 55 • The study findings cannot be generalised to all UK physiotherapists; however,
31
32 56 they provide potentially useful insights into the participant's experiences in
33
34 57 relation to barriers and possible solutions with respect to providing PA advice.
35
36
37 58

38 39 40 59 **INTRODUCTION**

41
42
43 60 Physical activity (PA) has multiple health benefits including improving mental health,
44
45 61 reducing risk factors leading to cardiometabolic diseases, and improving physical health
46
47
48 62 in cancer survivors.[1,2] The advice of the Chief Medical Officers (CMO) in the United
49
50 63 Kingdom (UK) is that adults should complete 150 minutes of moderate activity, or 75
51
52 64 minutes of vigorous activity each week or a combination, alongside strength training at
53
54
55 65 least twice weekly.[3] This is similar to the World Health Organisation (WHO) guidelines

1
2
3 66 of at least 150-300 moderate intensity aerobic PA, or 75 to 150 vigorous intensity PA,
4
5 67 with twice weekly strength training.[4] Twenty-eight percent of adults globally fail to reach
6
7 68 the recommended aerobic PA guidelines.[5] In the UK this figure was slightly lower with
8
9
10 69 39% of the population failing to meet the aerobic PA guidelines between 2019 and
11
12 70 2020,[6] 27% of which were classed as physically inactive, meaning they did less than 30
13
14 71 minutes of moderate PA a week.[6] Additionally, 43% of UK adults achieved the strength
15
16 72 PA guidelines between 2020-2121, which was a 1.2% decrease from the previous year.[6]
17
18 73 Whilst there are greater health benefits by reaching the recommended PA levels for most
19
20 74 individuals, there are still health benefits from completing even low amounts of light
21
22 75 intensity PA for those who are inactive or limited by chronic health conditions and to then
23
24 76 gradually increase intensity and duration over time.[4] With physical inactivity leading to
25
26 77 1.6 million deaths annually, and non-communicable diseases (NCDs) increasing,[7]
27
28 78 global strategies promoting health and wellbeing need greater attention to ensure world
29
30 79 health goals are achieved. In 2015, the United Nations agreed to promote healthy lives
31
32 80 and well-being for all ages, as part of the Sustainable Development Goal 3, which has
33
34 81 many health targets, including reducing premature mortality from NCDs by one third.[8]
35
36 82 In accordance with this, the WHO launched the Global Action Plan on Physical Activity
37
38 83 (GAPPA) in 2018 to reduce physical inactivity by 15%.[9] A major barrier to these goals
39
40 84 being achieved was the COVID-19 global pandemic and associated restrictions, which
41
42 85 led to more people working from home and to the temporary closure of gyms and sports
43
44 86 facilities, further decreasing PA levels in the UK population.[10] This has resulted in
45
46 87 decreased physical and functional capacity, increased mental distress and an increased
47
48 88 cardiovascular disease risk profile.[11] Therefore, now more than ever, public health
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89 policies and strategies to increase PA levels of the population safely require urgent
90 attention.[10]

91 The CMO identified HCPs as key conduits in the promotion of PA.[3] Physiotherapists are
92 found across multiple clinical areas and are seen as experts in non-invasive management
93 strategies; they are ideally placed to deliver PA guidance.[12] Physiotherapists reported
94 that health promotion, especially PA, was within their scope of practice (SOP).[13] Yet, in
95 a 2016 survey of 514 UK physiotherapists, only 16% knew all three components of the
96 CMO PA guidelines, despite 77% reporting that they discussed PA with patients.[14] Of
97 this sample, 12 completed follow up interviews where reported barriers to PA promotion
98 included patient complexity , work culture and a lack of time.[15] The authors also
99 reported some facilitators to health promotion, such as having repeated appointments,
100 collaborations with other services and building an alliance with the patient.[15]

101 Solutions to enable physiotherapists to successfully deliver PA guidance have yet to be
102 explored in depth,[15,16] particularly in the UK. Appropriate solutions are key for policy
103 development, HCP awareness of PA guidelines and also behaviour change in
104 physiotherapy management of patients. As knowledge of the PA guidelines has been
105 previously identified as poor amongst UK physiotherapists prior to the updated CMO and
106 WHO PA guidelines [14], it is yet unknown whether knowledge and awareness of the PA
107 guidelines has improved.

108 The aims of this qualitative study were to explore the current knowledge physiotherapists
109 have of the PA guidelines and promotion of PA, recognise common barriers experienced

1
2
3 110 by physiotherapists when delivering PA advice and identify physiotherapists' perceptions
4
5 111 of solutions to support successful delivery of PA guidance.
6
7

8 9 112 **METHODS**

10 11 12 113 **Design**

13
14
15 114 A qualitative research design was adopted in this study using semi-structured interviews
16
17 115 to explore the knowledge and perceptions towards providing PA advice to patients,
18
19
20 116 amongst a range of UK based physiotherapists. The research approach used in this study
21
22 117 has previously been used by other authors and provided informative accounts for HCPs
23
24 118 perceptions towards providing PA advice in healthcare.[17] The standards for reporting
25
26 119 qualitative research was followed throughout.[18] Ethical approval was granted by the
27
28
29 120 Faculty of Biological Sciences at the University of Leeds (27 July 2020/ BIOSCI 19-039).
30
31

32 121 **Participants and procedures**

33
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35
36 122 The inclusion criteria for this study included UK based physiotherapists who currently
37
38 123 practised and managed National Health Service patients, from any clinical field.
39
40 124 Participants were recruited through advertisement on the Musculoskeletal bulletin on the
41
42 125 interactive Chartered Society of Physiotherapy (iCSP) portal as well as through LinkedIn
43
44 126 and by word of mouth. The advertisement for this study informed prospective participants
45
46
47 127 that it was exploring physiotherapists' knowledge and promotion of PA to patients. Willing
48
49 128 participants followed a link to Microsoft Forms, where they viewed the participant
50
51 129 information sheet and completed an eligibility survey that included questions on the
52
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54 130 inclusion criteria. Eligible participants were emailed the participant information sheet to
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1
2
3 131 keep, containing details of what the study involved and a consent form, which was signed
4
5 132 by the participants and returned, then an interview date was arranged. Participants were
6
7 133 informed that they could withdraw from this study at any point, and this was reiterated at
8
9 134 the start and end of the interview. The recruitment and interview process continued until
10
11 135 data saturation was reached, when there were no more emerging themes or new
12
13 136 responses.[19]
14

18 137 **Data collection**

21 138 Interviews adopted a semi-structured design, which is a common method in healthcare
22
23 139 research [20], to encourage open ended responses that could be elaborated on with
24
25 140 probing for the limited responses, which explores participants' thoughts and beliefs.[21]
26
27 141 The interview guide was created by Vishnubala et al. [22] and adapted to make questions
28
29 142 specific to physiotherapists (see Supplementary file). The guide included 30 interview
30
31 143 questions, split into five sections: 1) demographics; 2) PA knowledge and education; 3)
32
33 144 resources and interventions; 4) COVID-19; and 5) other, providing an opportunity for the
34
35 145 participants to express any other thoughts or ideas that emerged during the interview. Not
36
37 146 all data collected from the interview questions were analysed as they addressed aspects
38
39 147 beyond the aims of this paper.[22] All interviews were conducted through the Zoom
40
41 148 meeting platform by the lead researcher AS. DV provided training to AS and a mock
42
43 149 interview was performed to practice and refine the interview technique and reduce any
44
45 150 researcher influence emerging in the delivery of the interview questions. Follow up calls
46
47 151 between AS, DV and CN reflected on the data collection of the initial few interviews to
48
49 152 make sure they captured rich and informative data and to review how the interviews had
50
51 153 gone. The interviews took place from March 2021 until May 2021 and were audio
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3 154 recorded. Interviews were automatically transcribed verbatim the same day by the Zoom
4
5 155 platform, checked for accuracy by the main researcher and stored securely on the
6
7 156 University of Leeds OneDrive. Each participant was assigned a participant number, with
8
9
10 157 any identifiable information anonymised.
11
12

13 158 **Data analysis**

14
15
16 159 A thematic analysis approach following Braun and Clarke's six steps was undertaken:
17
18 160 data familiarisation; coding; theme identification; revision of themes; defining and naming
19
20 161 themes; and writing up.[23] This method was chosen for its flexibility, whilst providing in-
21
22 162 depth complex data.[24] In reflecting similar approaches used elsewhere in the literature,
23
24 163 [17] interviews were transcribed verbatim and then read through several times in order to
25
26 164 become immersed in the data. Transcripts were analysed in order of occurrence, with
27
28 165 interesting features of each individual interview transcript identified and assigned a code.
29
30 166 All interesting features in the data or codes were subsequently collated from the semi-
31
32 167 structured interviews in a separate document, and across the data set common themes
33
34 168 were identified. To assure the credibility and trustworthiness of the data these were
35
36 169 reviewed for consistency by the lead researcher. Once the themes were initially
37
38 170 established these were discussed with a second researcher (CN) for purposes of
39
40 171 composition and consistency and to confirm interpretation of the themes. In a further effort
41
42 172 to assure credibility and trustworthiness, prior to the main analyses of the data, a pilot
43
44 173 analysis was undertaken separately by two members of the research team (AS and CN)
45
46 174 on two interview transcripts in order to confirm consistency and agreement in the
47
48 175 interpretation of codes and reflect on emerging themes and to ensure that transcriptions
49
50 176 represented participant responses and to reduce the likelihood of researcher bias.[24,25]
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3 177 At each step in the thematic analysis the lead researcher (AS) reviewed progress with
4
5 178 members of the research team (CN and DV) as undertaken in other peer review
6
7
8 179 research.[17]
9

10
11 180 Regarding demographic data, IBM SPSS statistics V.27 was used to describe participant
12
13 181 characteristics, including gender, level of education, years of experience, healthcare
14
15 182 setting and UK region, which were presented as proportions and frequencies. The
16
17 183 number of years of experience were categorised into 0-5 years, 6-10, 11-15, 16-20, and
18
19 184 >21 years. Locations of work were grouped into UK regions. Example quotes from
20
21 185 transcripts were presented in tables for each theme.
22
23
24

25 26 186 **Patient and public involvement**

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28
29 187 None.
30
31

32 188 **RESULTS**

33 34 35 189 **Participant characteristics**

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39 190 Twenty-one potential participants completed the eligibility survey, but one did not meet
40
41 191 the inclusion criteria and a further two failed to return the consent form. Data saturation
42
43 192 was reached after 18 interviews and therefore no further participants were recruited.
44
45 193 Interview length ranged from between 35 to 72 minutes. Demographic characteristics of
46
47 194 the 18 physiotherapists who were interviewed are shown in Table 1. The sample
48
49 195 consisted of physiotherapists across six different UK regions, with 67% female and 61%
50
51 196 working in outpatient settings. Fifty percent of the sample had less than five years of
52
53 197 experience and 56% had either a postgraduate diploma or a masters level qualification.
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198 **Table 1. Participant characteristics (n=18)**

Characteristic	Category	n (%)
Gender	Male	6 (33.3)
	Female	12 (66.7)
Level of education	BSc or equivalent	8 (44.4)
	BSc + postgraduate diploma	3 (16.7)
	BSc + MSc	7 (38.9)
Years of experience	0-5	9 (50)
	6-10	6 (33.3)
	11-15	0 (0.0)
	16-20	2 (11.1)
	21+	1 (5.6)
Healthcare setting	Inpatients	5 (27.8)
	Outpatients	11 (61.1)
	Both	2 (11.1)
UK region	West Midlands	3 (16.7)
	East Midlands	8 (44.4)
	Yorkshire and Humber	4 (22.2)
	North West	1 (5.6)
	London	1 (5.6)

Scotland

1 (5.6)

199 *BSc, Bachelor of Science; MSc, Master of Science; n, number; UK, United Kingdom.*

200

201 **Themes from thematic analysis**

202 Following thematic analysis of the data set, five themes were identified as barriers and
203 solutions to promoting and delivering PA guidance: physiotherapist intrinsic barriers; lack
204 of emphasis and priority given to PA; patient barriers to delivering PA; increasing
205 awareness of the PA guidelines; and optimising the delivery of PA. Amongst the five
206 themes, 16 sub-themes were also identified from the interview transcripts.

207 ***Theme 1: Physiotherapist intrinsic barriers***

208 In relation to the CMO PA guidelines, 22% of physiotherapists correctly stated the three
209 components of the guidelines (150 minutes of moderate or 75 minutes of vigorous
210 intensity aerobic activity and twice weekly strength training), whilst 39% did not know any
211 of the components of the PA guidelines. Vigorous intensity PA was the most incorrectly
212 answered or unknown component, followed by the strength recommendations. Many of
213 the physiotherapists admitted that they had a lack of knowledge of the PA guidelines, with
214 some stating they had either not heard of or read the UK CMO PA guidelines, would not
215 know where to find them and had also not seen any of the accompanying resources, such
216 as infographics. Other emerging barriers were that the physiotherapists expressed low
217 confidence and fear of giving PA advice, in case they gave incorrect advice, or something
218 went wrong as a result of this dissemination (Table 2).

219 **Table 2. Sub-themes for physiotherapist intrinsic barriers to delivering PA advice**

Sub-theme	Example quotes
Perceived lack of knowledge of the PA guidelines	<p><i>"I guess my lack of knowledge of the exact parameters that we should be advising. So, I think because I'm not 100% sure how many minutes I should be giving, I don't want to advise patients wrongly."</i> P1</p> <p><i>"My lack of knowledge in terms of not being up to date with what needs to be done in certain cases. Like, if it's like chronic low back pain or diabetes, or some such diseases, I know what to do, but if there's something beyond this which I haven't read or talked about or it's a more complicated presentation, this is what kind of keeps me a bit apart for not giving that advice."</i> P8</p>
Confidence/fear of giving PA advice	<p><i>"I think there is a bit of fear of giving the wrong advice and getting penalised for that and also kind of an anxiety is if you've given some advice and it hasn't helped, will you be held accountable?"</i> P7</p> <p><i>"We know physiotherapy as an intervention doesn't have too many risks associated and certainly not severe ones like other interventions, but I think when we prescribe exercises that tends to be maybe one of the more risky things we do. And so yes, I'd probably say the fear associated with what if it goes wrong, and I think maybe a lack of support from, whether it's the company in terms of training or support."</i> P18</p>

220 PA, physical activity.

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4 221 **Theme 2: Lack of emphasis and priority given to PA**

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7 222 There were multiple barriers that focused on lack of emphasis and priority given to
8
9 223 promoting PA, identified by the physiotherapists (Table 3). These included many
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11 224 expressing that they received minimal training on PA, both at university and through
12
13 225 continuing professional development (CPD) offered at work. Time was a common barrier
14
15 226 and issue amongst those interviewed, often because of multiple tasks required within an
16
17 227 appointment that were considered a greater priority. Staffing shortages, pressures for
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19 228 quick discharges and work cultures that deprioritises education and advice over other
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21 229 treatments such as manual therapy, were other less common but important barriers
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26 230 mentioned by some participants.
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231 **Table 3. Sub-themes for lack of emphasis and priority given to delivering PA advice**

Sub-theme	Example quotes
Lack of CPD training at work	<p><i>"We have not had any postgraduate or sort of say with, you know, in house extensive training around physical activity, just more something that we touch on. That is if we're looking at you know management of low back pain, we might then say, but physical activity, e.g. walking, is important but there won't be much depth behind physical activity as a topic."</i> P18</p> <p><i>"Since graduating, I don't think that I've had any specific further training on specific like recommendations for physical activity."</i> P14</p>
Lack of emphasis through training at university level	<p><i>"I wouldn't say I've had that much specifically about exercise while I've been working"</i> P10</p> <p><i>"So, I guess the university BSc course I did there was some sort of exercise prescription, strength and conditioning type tutoring, but I think it was one or two lectures and tutorials so it made up of a small part of kind of the course and our studies."</i> P13</p> <p><i>"I think, would probably fairly minimal training undergrad because it was quite long ago I trained."</i> P16</p> <p><i>"So we've obviously done a bit on health promotion and health activity in university. There was probably a lecture or two on it. There was also an optional module which I opted not to take."</i> P9</p> <p><i>"In terms of my physiotherapy training specifically, I've not had much specific training on physical activity. I would say that my training around is probably very limited in terms of from university I don't think they touched on it that much he was on a very brief."</i> P5</p>
Time pressures	<p><i>"If you have someone coming in to see you with a specific condition, so if it is pain or with an injury or whether it is acute or long term, you are going to have to go through that, assess it before your objective assessment, provide them with advice and specific exercises for that condition. Write the notes, get them booked in, write out the exercises, whatever it is. And if you want to give that advice on top of that, you just don't have time, so if you've got someone coming to a specific condition that's going to take priority over general lifestyle advice, even if we feel as though that they may really benefit from that, so time is a huge factor."</i> P6</p>

“It also might be that you just don't have the time to do it and give that advice, because you're under so much pressure from your patient caseload and so time is definitely a barrier.” P7

232 PA, physical activity, CPD, continuing professional development.

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3 **233 Theme 3: Patient barriers to delivering PA**
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6 234 Another commonly identified theme amongst physiotherapists was patient limitations to
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8 235 delivering PA advice (Table 4). This included physiotherapists reporting that patients often
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11 236 had low compliance to home management, particularly with exercise. Patient fear of doing
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13 237 PA, in case of reinjury or exacerbation of symptoms, was also a reoccurring perception
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15 238 by physiotherapist, particularly for patients who had chronic conditions, with low PA
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17 239 levels. Another common barrier was patient expectations of physiotherapy management,
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19 240 which would often not align with exercise or PA advice, with many reporting that patients
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21 241 would prefer quick fixes and passive treatments such as massage.
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242 **Table 4. Sub-themes for patient barriers to delivering PA**

Sub-theme	Example quotes
Patient compliance	<p data-bbox="447 394 1927 565">“Sometimes your patients just don't want to do it, they won't have any of it. I think there's a mixture of reasons that you can't really just pinpoint to on certain factors that affects just how you might deliver physical activity advice kind of thing, because sometimes patients are just not on board and with behaviour modification. With behaviour motivational interviewing, you definitely need them to have some sort of interest before actually trying to then even try doing anything really because if they are not on board, they are not going to do it when you tell them.” P9</p> <p data-bbox="447 597 1927 695">“I guess sometimes maybe the compliance. Again, I'm just thinking about the demographic of some patients that I see, they may find it quite hard to change the amount of physical activity or find that it's not something that they're necessarily prioritising or too willing to do so maybe that behaviour change element.” P18</p>
Patient fear of exercise	<p data-bbox="447 773 1938 837">“Kind of what I've experienced a lot recently is people that have come in with say like pain or you know, like crepitus in the knee. And quite fearful of movement and quite fearful of exercise and kind of have that fear avoidance.” P4</p> <p data-bbox="447 870 1896 935">“Quite often, in regards of exercise as well, any physical activity is a fear avoidance, patients are just afraid to do and make things worse.” P3</p>
Expectations of physiotherapy	<p data-bbox="447 1016 1938 1114">“Patient expectations of a physio appointment. So, if they're just wanting manual therapy, for example, and we're chewing their ear off about walking more and keeping themselves active and moving or trying to encourage them to pick up a new hobby if they are pretty sedentary, then that could be a barrier as well.” P18</p> <p data-bbox="447 1146 1896 1276">“We see a lot of chronic pain patients who are looking for a quick fix. And they might turn towards medications or massage or other passive interventions, which actually I try and use the analogy to patients around chronic pain that it's not a machine that can be fixed or should be fixed, but instead of garden that we should try and tend to regularly and, and then that way we may have better success at keeping on top of chronic pain.” P18</p>

243 PA, physical activity.

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4 244 Solutions and successful approaches to managing patients with chronic and acute
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6 245 conditions were discussed in the interview, in addition to their opinions on the most
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9 246 efficient and effective ways to communicate the PA guidelines.
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12 247 ***Theme 4: Increasing awareness of the PA guidelines***
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15 248 A key theme identified from physiotherapists in response to successfully promoting PA to
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17 249 patients was to increase awareness of the PA guidelines to both patients and
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20 250 physiotherapists (Table 5). Most responses included improving staff training with some
21
22 251 suggesting it should be a mandatory annual module and others proposing having more
23
24 252 group discussions between staff on PA and its benefits. Awareness of local initiatives and
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26
27 253 exercise referral schemes (ERS) to enable signposting was also recommended as a
28
29 254 solution, particularly for those with time constraints and to support the patients more long-
30
31 255 term. Social media was mentioned on multiple occasions as a solution to both increasing
32
33 256 awareness of PA and PA opportunities for the general public and physiotherapists alike,
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36 257 such as Twitter or LinkedIn, by following influential people in the field and listening to
37
38 258 podcasts. Social media was specifically recommended as a useful tool to raise awareness
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40 259 to the younger populations and those who regularly use technology, though, for
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42 260 populations less suited to social media many physiotherapists suggested television
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45 261 advertisement to engage more people and spread awareness of the PA guidelines.
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262 **Table 5. Sub-themes for increasing awareness of the PA guidelines as a solution to delivering PA advice**

Sub-theme	Example quotes
Staff training	<p><i>"I think better ongoing potentially mandatory training or better kind of educational pieces that go out across the board." P2</i></p> <p><i>"If we do it as a yearly in-service training, just as a refresher, it makes it more accessible, because if someone's a bit embarrassed or they don't want to ask when they feel they should know, but they don't know where to know, if you do it as a training for the whole team then that's not targeting anyone, but it is very informative." P7</i></p>
Use of campaigns through television and advertising	<p><i>"I think TV ads would be quite useful. Often when I'm prescribing exercises to patients that are very sedentary, I use the advert break, as an example of when they could get up change their posture, move around. Do something, do their exercises if they so desire. So having an actual maybe government led advertisement, because the people that are going to see that are the ones that have sat all day in front of the TV." P1</i></p> <p><i>"Kind of just campaigning that everybody should be doing, you know even just like adverts on TV, you know, like so it's kind of in people's faces a bit more frequently and every day." P11</i></p>
Use of social media	<p><i>"If you want to get the younger ones you need to go social media, you need to get your TikTok influences, you need to get your instagrammers." P17</i></p> <p><i>"Social media is the only way forward I think at the minute and it's difficult because obviously you do want to target the older generation as well, however, like I said before, culture change takes such a long time that I think the main way to get it across to people nowadays is through social media and get that to filter down through the next generations" P12</i></p>

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Signposting
to other
exercise
services

"I think we're quite lucky particularly in Sheffield in that we've got sort of for those patients who we know are safe and obviously are happy to do activity we've got a lot of referral schemes, so we've basically got like SPARS [Sheffield Physical Activity Scheme] access which has got physical activity guidance, and so we can actually send them through to health trainers. So they give again further guidance on exercise obviously dieting and things like that." P5

"So, one of the ways I think was having further links with like community, like gyms or, like other outdoor spaces. They could yeah link in with that you can like continue the programme after it's like just a clinical referral and, like the six weeks, whatever and then after that the physical activity should carry on." P14

263 PA, physical activity.

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3 264 **Theme 5: Optimising the delivery of PA**
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6 265 Successful approaches were discussed in terms of delivering PA advice to patients with
7
8 266 chronic and acute conditions and how promotion can be optimised (Table 6). With patient
9
10 267 barriers in mind, many participants suggested ensuring any PA prescription should be
11
12 268 individualised, functional and based on what the patient enjoys. Many also reported
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14 269 communication as a key factor and that the language used should not be patronising,
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16 270 forceful or lack empathy, which echoed the advice physiotherapists would give towards
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18 271 encouraging less enthusiastic colleagues to promote PA. To facilitate discussions and
19
20 272 support patients, visual resources, such as infographics, were advocated; some
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22 273 suggested giving them to patients after an appointment or displaying them in waiting
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24 274 rooms and toilets. Other visual resources, such as leaflets and handouts, were also
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26 275 mentioned.
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276 **Table 6. Sub-themes for optimising delivery of PA advice**

Sub-theme	Example quotes
Make PA individualised and functional	<p data-bbox="428 435 1835 500"><i>“Get to know them as an individual, so ask them their current hobbies and the types of activities that they are interested in. So that I can tailor the activity to their needs and something that I think they are likely to do.” P1</i></p> <p data-bbox="428 532 1898 636"><i>“I think for anyone who's maybe going to increase their physical activity, I'd have given them advice to sort of take their time with it, just ease themselves in and find something they enjoy and that's regardless of chronic conditions and or anything really.” P13</i></p>
Have gradual approach to introducing PA	<p data-bbox="428 727 1919 824"><i>“If someone's got a long-term condition, it might be more of a structured manner, so I might start off really small and then, catch up with them, see how they responded to it and then incremental it up and just progress things on a lot slower.” P6</i></p> <p data-bbox="428 857 1940 961"><i>“If they have had pain a long time, I would probably want to at least begin at a low manageable intensity or volume, and then have that graded exposure to it, so gradually building things up as to, so they can not only build confidence, but they're able to manage it without having regular flare-ups.” P18</i></p>
Supportive communication	<p data-bbox="428 1019 1940 1182"><i>“I think appreciating where patients are. So, kind of sympathising with the fact that they're in pain, in particular for chronic patients with chronic problems. You know I hear a lot that people don't listen, believe me, they think I'm putting it on, or they think I should be able to do more and I think just understanding and sympathising is a really good starting point, because I think once people feel listened to, then they're more likely to take on board the advice of education that you can offer them.” P16</i></p> <p data-bbox="428 1214 1940 1375"><i>“The biggest thing I've learned is to not ram it down their throat and try and come across you know better because, it just really pisses people off, but, in terms of trying to just say this is what you could be doing, how much of that do you think you could manage which sounds like it's doable for you and kind of go from there seems to work quite reasonably well.” P15</i></p>

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"I'd say if I have to pick one, I would go for the government infographics just because they've got the information that you can print out and stick up. So, you've got everything you need and is not in depth and it's obviously patient friendly as well, so it is simple, for everyone, and everyone can understand it, so I'd probably say that's the best resource, in my opinion." P5

Use of visual resources

"Infographics, so if you've got certain clinicians who are visual learners, let's say, using things like that they might be ones that they can print off, put up in their clinic rooms I've seen that before and facilitates that discussion with the patient." P18

277 PA, physical activity

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278 **DISCUSSION**

279 The aims of this study were to provide a greater insight into UK physiotherapists' current
280 levels of PA knowledge and identify the main barriers and solutions perceived to
281 delivering PA guidance and we have used these terms as an organising framework to
282 structure the discussion. Among the study participants, few physiotherapists knew the UK
283 CMO PA guidelines, despite these having been updated in 2019 and identifying HCPs,
284 including physiotherapists, as key to their dissemination.[3] Further, very few of the
285 participants knew where to access the PA guidelines and associated infographics.
286 Common barriers found included: lack of time, low confidence, limited PA training at
287 university and through CPD once qualified, in addition to patient expectations, compliance
288 and fear of exercise. Solutions, separated into increasing awareness of the PA guidelines
289 and optimising delivery of the PA guidelines, consisted of using television advertisement
290 campaigns and social media to spread awareness; increased staff training; signposting
291 to local services; following individualised and gradual approaches for patients with chronic
292 conditions; having good communication; and use of visual resources, such as
293 infographics, to facilitate the PA advice given by physiotherapists.

294 **Barriers**

295 ***Physiotherapist knowledge and intrinsic factors***

296 Having knowledge and awareness of the PA guidelines is an important factor in being
297 able to successfully promote PA. Around 22% of participants correctly identified moderate
298 and vigorous intensity aerobic activity and strength recommendations in this study. This

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3 299 was only slightly higher than that found in previous research where 16% of 514 UK
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5 300 physiotherapists correctly identified all three components.[14] Whilst this study only had
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7 301 18 participants, making true comparisons difficult, the findings might suggest that the
8
9 302 2019 updated CMO PA guidelines have had little impact on the knowledge or awareness
10
11 303 of physiotherapists. However, it appears reduced knowledge of PA is not specific to UK
12
13 304 physiotherapists, as Yona et al. found that of 1062 Israeli physiotherapists who took part
14
15 305 in a survey in 2018, 87% reported awareness of PA guidelines, yet only 6.8% correctly
16
17 306 stated all three components of the guidelines, with vigorous intensity PA and strength
18
19 307 components being the least known,[26] similar to the present study. This could be due to
20
21 308 physiotherapists possibly feeling more confident recommending light or moderate
22
23 309 intensity PA to reduce likelihood of adverse effects, particularly for more complex patients
24
25 310 typically with comorbidities such as cancer, heart or respiratory conditions, and are
26
27 311 therefore, less aware of the other recommendations. Awareness of the guidelines and
28
29 312 where to locate them were clear issues in this present study, with many not knowing
30
31 313 where to find the CMO PA guidelines, which questions the effectiveness of the
32
33 314 communication strategy when the guidelines were updated in 2019. Awareness of the
34
35 315 CMO PA guidelines was also recently reported to be limited in a qualitative study of 15
36
37 316 GPs recent by Vishnubala et al.[22] Another larger study in 2016 of 1,013 GPs found that
38
39 317 30% had never heard of the CMO PA guidelines and a further 50% had heard of them
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41 318 but were very unfamiliar.[27] Arguably, the lack of awareness of the CMO PA guidelines
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43 319 could be a result of HCPs using alternative PA guidelines, with some participants in this
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45 320 study reporting using the WHO guidelines. Nevertheless, the recommendations from the
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3 321 different guidelines are very similar and thus does not justify limited knowledge of the key
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5 322 components of the CMO PA guidelines.
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9 323 Fears of litigation are prevalent in healthcare, which can prevent HCPs from delivering
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11 324 some treatments. De Vivo and Mills identified fear and a perception of vulnerability as a
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13 325 barrier experienced by 10 midwives who gave PA advice to pregnant patients,[28] which
14
15 326 was also reported by nurses and GPs who managed diabetic patients, leading to
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17 327 disengagement in PA advice.[17] This is especially important when patients can both
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19 328 benefit from increasing their PA and also present with a readiness to change their PA
20
21 329 status. Further, Lowe et al. highlighted that PA discussions were more difficult with
22
23 330 complex patients.[15] A survey of 7,026 GPs in 2012, found that many would practise
24
25 331 defensively, particularly for high-risk patients due to the impact of complaints.[29] This
26
27 332 perceived risk, could be attributed to lack of knowledge of how to adapt PA to the patient's
28
29 333 needs leading to reduced confidence giving the advice. Yet, many physiotherapists in this
30
31 334 present study were at least fairly confident giving PA advice, which may be due to
32
33 335 physiotherapists seeing health promotion as part of their SOP and that they have the
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35 336 skills to engage the patients into changing their lifestyle by basing PA advice on
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37 337 experience rather than specific guidelines. Indeed, physiotherapists have at least
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39 338 confidence in providing basic PA advice, though are possibly more fearful with complex
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41 339 patients due to the increased risks.
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49 340 ***Lack of emphasis and priority***
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52 341 Lack of emphasis and priority placed on PA is another barrier faced by physiotherapists
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54 342 in this study. Although HCPs are identified as being key to PA promotion in the CMO
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3 343 guidelines, the time pressures during assessments are a frequent challenge for many
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5 344 physiotherapists, with time being the most cited barrier by 22 UK inpatient
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7 345 physiotherapists during focus groups.[13] Time pressures during appointments have an
8
9 346 impact on the ability to give advice, leading to prioritisation of tasks and mean significantly
10
11 347 less lifestyle advice is provided.[30] Furthermore, perceptions that PA advice is a low
12
13 348 priority needs to be changed. In part, this would require training and a greater emphasis
14
15 349 on the dissemination of PA guidance by HCPs. A lack of training on PA by HCPs is not
16
17 350 uncommon,[17] despite over half of the physiotherapists in this study completing a
18
19 351 postgraduate diploma or master's degree many reported inadequate training on PA,
20
21 352 questioning the integration of health promotion in the curriculum. Yet, physiotherapy
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23 353 students who took part in focus groups, reported receiving academic public health training
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25 354 and reported completing public health qualifications whilst at university.[31] This suggests
26
27 355 that while public health topics are being taught at university, a possible lack of emphasis
28
29 356 and importance placed on PA and how to promote PA effectively, is leading to the
30
31 357 knowledge not being sustained. A lack of emphasis on training on PA promotion seems
32
33 358 to be an issue that continues post qualification with 55% of GPs reporting not receiving
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35 359 any CPD on PA since leaving university.[27] It also raises questions if training and
36
37 360 education that has been provided through recent initiatives such as the Public Health
38
39 361 England Clinical PA Champions programme has been accessed and subsequently used
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41 362 to the full effect.

42 363 ***Patient barriers***

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44 364 Patient barriers for taking up PA advice can heavily impact on clinical outcomes if not
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46 365 identified and addressed. The perception of low patient compliance was a re-emerging

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3 366 barrier in this study, which reflected previous findings where 24% of Australian
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5 367 physiotherapists agreed PA advice would not change a patient's behaviour.[32] Whilst
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7 368 this perception of low compliance may be warranted in some cases and based on
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10 369 experiences, it may also be that exercises and PA prescribed are not meeting the needs
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12 370 of the patient. Indeed, UK based Pakistani women identified that exercise-based
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14 371 management did not meet cultural needs, leading to poor compliance.[33] Patient
15
16 372 demographics can also influence compliance, with smokers and the elderly less likely to
17
18 373 change their PA levels.[34] Moreover, this may feedback to low confidence of
19
20 374 physiotherapists in modifying advice to tailor approaches that are socio-culturally
21
22 375 meaningful to individuals from diverse backgrounds. Additionally, patient expectations of
23
24 376 physiotherapy can contribute to poor compliance, with some patients more reliant on
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26 377 passive treatments such as massage compared to active treatments such as
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28 378 exercise,[35] which was highlighted as a barrier in this study. Regardless of expectations,
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30 379 patient fear can affect compliance, often as a result of exercise misconceptions, poor
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32 380 clinician communication or negative past experiences, leading to the perception that PA
33
34 381 is harmful and causing fear avoidance.[36,37] Fear avoidance of PA, particularly with
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36 382 chronic musculoskeletal conditions, can impact on clinical outcomes and rehabilitation if
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38 383 not addressed.[38] Patient barriers should not be overlooked when promoting PA and
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40 384 therefore strategies to optimise compliance, reduce fear and manage expectations are
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42 385 vital for succeeding in behaviour change.
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50 386 **Solutions**

51 52 53 387 ***Increasing awareness of the PA guidelines***

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3 388 Increasing awareness of the PA guidelines to both patients and physiotherapists was one
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5 389 solution identified in this study. Indeed, with inadequate training reported, there is a need
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7 390 for improvements in undergraduate and staff training, an opinion also expressed by other
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9 391 HCPs.[22,17] A possible explanation for this is that many physiotherapists often
10
11 392 incorporate exercise prescription into a patient's management plan and so feel they
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13 393 already have the skills to deliver PA advice to some extent.[16] Nevertheless, for those
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15 394 with more limited knowledge of the CMO PA guidelines, staff training would benefit
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17 395 physiotherapists giving them confidence in discussing PA with any patient. Awareness of
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19 396 local services and ERS available to facilitate signposting can also support
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21 397 physiotherapists that lack confidence providing specific PA guidance. In addition, the
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23 398 importance of having PA resources and information in one consolidated place is also
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25 399 important in this respect.[17] To improve adherence, exercise professionals have
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27 400 suggested that HCPs should understand the schemes they signpost to, so that they are
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29 401 not used as a last resort and ensure the patient is motivated to participate.[39] Signposting
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31 402 appears to be an effective solution to PA promotion, though this requires the availability
32
33 403 of schemes, and awareness and understanding for HCPs to appropriately refer patients
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35 404 to these services.[17]

43 405 ***Optimising delivery***

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46 406 Optimising the delivery of PA guidance is essential for patient understanding, compliance
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48 407 and subsequent clinical outcomes. Graded exposure to PA for those who are fearful or
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50 408 deconditioned was one of the proposed successful approaches to delivering PA guidance
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52 409 in this study and has previously been reported as an effective sustainable approach to
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54 410 prescribing exercise,[38] whilst still offsetting the adverse effects that being inactive can

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3 411 cause.[40] Making PA individualised, with consideration of patient preferences to build
4
5 412 confidence is more favourable by patients.[41] This person centred approach, in addition
6
7 413 to goal setting and self-monitoring, has been found to be an effective behavioural change
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9 414 technique, leading to long term change in PA levels.[42] Moreover, use of other
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11 415 behavioural therapies, such as acceptance and commitment therapies (ACT), which were
12
13 416 developed from cognitive behavioural therapy (CBT) can be used to direct development
14
15 417 of interventions to sustain long term behaviour change and compliance to PA.[43]
16
17 418 Additionally, good communication has been found to be crucial to challenge the
18
19 419 misconceptions leading to poor compliance, especially in patients with chronic conditions
20
21 420 where pacing is advised,[36] whereas forceful or patronising language discouraged
22
23 421 patients from communicating their concerns.[44] Furthermore, there are multiple factors
24
25 422 that can influence a patient's response to PA advice and therefore, the approach taken
26
27 423 and language used is vital for successful changes in behaviour and thus needs to be
28
29 424 carefully considered by HCPs.

30
31 425 To further facilitate discussions, visual resources, such as leaflets, have also been
32
33 426 suggested to reinforce advice given to patients.[22] HCPs have previously reported
34
35 427 leaflets as a convenient concise way to help focus information during a consultation and
36
37 428 more convenient than using websites.[17] Freene et al. found that 93% of an Australian
38
39 429 physiotherapy sample also agreed having resources would be useful for promoting
40
41 430 PA.[32] Leaflets have been found to improve patient satisfaction, communication and
42
43 431 reduced need for reassessments of the same pathology in French emergency
44
45 432 departments.[45] Additionally, infographics have been found to be an effective visual way
46
47 433 to convey complex information on PA, though the effectiveness of influencing health

1
2
3 434 behaviour change is unknown.[46] In this study some participants reported displaying the
4
5 435 CMO PA infographics in waiting rooms and toilets, which increases exposure to the PA
6
7
8 436 guidelines and may facilitate discussions. However, as the CMO PA infographics are
9
10 437 aimed towards HCPs, consideration is needed to ensure displayed information is not too
11
12 438 complex to meet the needs of patients.[47] Visual resources can assist physiotherapists
13
14 439 in promoting PA and reinforce the message delivered during the appointment, though
15
16
17 440 must involve patient friendly material.

20 441 **Strengths and limitations**

22
23 442 To the authors' knowledge, this is the first study to review UK physiotherapists' knowledge
24
25 443 of the updated 2019 CMO PA guidelines and explore, in depth, physiotherapists'
26
27 444 perceived solutions to address the barriers faced when delivering PA guidance. Virtual
28
29 445 interviews conducted using online platforms enabled recruitment of physiotherapists from
30
31 446 all over the country, increasing the representation across different geographical areas.
32
33 447 Additionally, the sample contained a range of clinical expertise and years of experience.
34
35 448 The interview questions enabled flexibility to responses and encouraged reflection of
36
37 449 personal practices on delivering PA advice that could help improve the promotion of PA
38
39 450 guidelines. Moreover, this study highlights the importance of holding dialogue with
40
41 451 physiotherapists when identifying solutions for promoting the CMO guidelines. Limitations
42
43 452 include increased risk of bias due to having a volunteer sample, with those who are more
44
45 453 enthusiastic about PA or have more knowledge on the topic being more likely to
46
47 454 participate. Findings cannot be generalised to UK physiotherapists per-se, as qualitative
48
49 455 data is heavily impacted by personal viewpoints and values; however, these findings
50
51 456 provide valuable insights into physiotherapists' awareness and application of CMO PA
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2
3 457 guidelines and provides a foundation for future research. Moreover, this study also
4
5 458 provides valuable insights that inform future intervention design aimed at supporting
6
7 459 physiotherapists in this study to give PA advice. Placing physiotherapists at the heart of
8
9 460 these discussions is important in shaping workable solutions aimed at promoting the PA
10
11 461 guidelines in routine care. Greater depth in the analysis of themes by comparing the
12
13 462 different clinical fields of physiotherapy would have added value and enable more specific
14
15 463 solutions to each clinical field. Finally, although efforts were made to reduce researcher
16
17 464 bias by reviewing and discussing the themes to ensure reliability of interpretations, and
18
19 465 reflection at each stage following Braun and Clarke's six steps, there was still a risk of
20
21 466 bias when interpreting the results.
22
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26

27 467 **Clinical implications**

28
29
30 468 Placing physiotherapists at the heart of discussions is important in shaping workable
31
32 469 solutions aimed at promoting the PA guidelines in routine care and so ongoing dialogue
33
34 470 is important in effective intervention design and delivery aimed at this group of HCPs;
35
36 471 though, it is acknowledged that this does not consider the wider determinants of
37
38 472 professional practice, such as workloads, remuneration, time pressures, and priorities for
39
40 473 both patients and physiotherapists. Nonetheless, as barriers and knowledge appear to
41
42 474 be unchanged with time,[14,15] action is needed both at university level and through CPD
43
44 475 to increase knowledge and awareness of the PA guidelines. Physiotherapists should
45
46 476 accept responsibility of their own development on PA knowledge and reflect on their
47
48 477 current practices, comparing to the optimised approaches suggested in this study and
49
50 478 adapt accordingly, especially for those with different socio-cultural backgrounds.
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52 479 Following this study, future research needs to explore any differences in the barriers and
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3 480 solutions to delivering PA advice between various clinical fields of physiotherapy.
4
5 481 Following this, action is needed to begin implementing the solutions raised, to challenge
6
7 482 these persisting barriers and to evaluate the effectiveness of these solutions in supporting
8
9
10 483 physiotherapists delivering PA advice. Consideration of behavioural change techniques
11
12 484 and use of ACTs can help to guide development of interventions for either clinicians or
13
14 485 patients to improve and sustain PA levels in the population. The continued involvement
15
16 486 of physiotherapists started within this study is important in shaping such solutions.
17
18
19

20 487 **CONCLUSION**

21
22
23 488 Despite updates to the CMO PA guidelines and previous research highlighting barriers to
24
25 489 physiotherapists delivering PA advice, the same barriers including time, inadequate
26
27 490 training and low patient compliance remain. Whilst physiotherapists have some
28
29 491 confidence delivering PA advice, many felt their knowledge of the PA guidelines
30
31 492 specifically was limited. Increasing awareness and optimising delivery of PA were
32
33 493 identified as the main solutions to increasing PA promotion, with a greater emphasis
34
35 494 needed on PA in training and specific approaches to increase the efficiency of giving PA
36
37 495 advice being suggested. These findings can be used to help to facilitate implementation
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39 496 of the solutions and future research should then evaluate the effectiveness of the
40
41 497 implemented strategies in supporting PA discussions, to increase the public's PA levels.
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3 501 **Declarations**
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6 502 **Ethics approval and consent to participate**
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8

9
10 503 Ethical approval was granted by the Faculty of Biological Sciences at the University of
11
12 504 Leeds (27 July 2020/ BIOSCI 19-039). All participants were given a study information
13
14 505 sheet and provided informed consent to participate.
15
16

17
18 506 **Consent for publication**
19

20
21 507 Not applicable.
22
23

24 508 **Data availability statement**
25

26
27 509 The datasets generated and analysed during the current study are not publicly available
28
29 510 due to all material used in the analysis being reports and not databases. However,
30
31 511 anonymised interview transcripts are available from the corresponding author on
32
33 512 reasonable request.
34
35
36

37
38 513 **Competing interests**
39

40
41 514 The authors declare that they have no competing interests.
42
43

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45

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48
49

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51 517 **Contributors**
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3 518 AP and DV developed the research question, concept and design, while AI, CN and KM
4
5 519 acted as methodological council. AS led data collection and analysis, supervised by DV
6
7 520 and CN. AS produced a first version of the manuscript. AI, AP, AS, CN, KM and DV
8
9 521 revised the manuscript to bring it to its current version. All authors have read and
10
11 522 approved the final manuscript.
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14

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4 1 **SUPPLEMENTARY FILE**
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7
8 2 **INTERVIEW GUIDE**
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10 3

11 4 [Thank the participant for attending the interview]
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14 6 [Participant to have read the PIS and consent form, and returned a completed copy of
15 7 the consent to the researcher prior to the interview]
16
17 8

18 9 [Researcher and participant to introduce themselves. Researcher to introduce the
19 10 evaluation and the purpose of the interview]
20
21 11

22 12 [Reiterate that the information participants provide will be anonymised and confidential.
23 13 **Check that the participant is comfortable with the interview being recorded]**
24
25 14

26 15 **START RECORDING**
27
28 16

29 17 **In this interview I am interested in hearing about your experiences of**
30 18 **delivering physical activity (PA) guidance to a patient, your opinion as a**
31 19 **clinical expert in PA on the barriers, challenges and solutions to improving**
32 20 **health care professionals given PA advice and views on current**
33 21 **interventions/developments.**
34
35 22

36 23 Please be assured that you will remain anonymous and the research team will not share
37 24 your comments with anyone else, so be as honest as you can. If there are any
38 25 questions that you would prefer not to answer you do not have to answer them. If at
39 26 any point you do not understand what I am asking or need some clarification, please
40 27 feel free to ask as we go along. You will be given an opportunity to say anything that
41 28 we have not covered at the end of the interview
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5 30 Do you have any questions about the interview before we begin?
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7 31 **DEMOGRAPHICS and KNOWLEDGE**
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9
10 32 Q1. State your role, level of study, experience and current location of work (primary or
11
12 33 secondary care)
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15 34 Q1a. What is your speciality/discipline?
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18 35 Q1b. How many years' experience post-graduation do you have?
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22 36 Where work- eg hospital
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25 37 Q1c. Do you know the basic recommendations for physical activity a week?
26

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28 38 Q2. Which statement best describes your own PA:
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32 39 1. Currently meeting the CMO PA guidelines of 150 mins moderate/75 min vigorous
33
34 40 weekly PA or combination of both
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37 41 2. Currently doing some PA 30 mins moderate physical activity (MPA) per week,
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39 42 but not meeting CMO PA guidelines of 150 mins moderate/75 min vigorous weekly PA or
40
41 43 combination of both
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44 44 3. Currently doing less than 30 min MPA per week
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48 45 PRIOR TO COVID AND AFTER- why??
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52 46 Q3. Tell me about the education and training that you have received in relation to PA
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3 47 [Education and training during formal medical degree and Continuous Professional
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5 48 Development; Knowledge of PA guidelines; Feelings/confidence around delivering CMO
6
7
8 49 PA guidance] Under/postgrad
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11 50 Q4. If someone is diagnosed with chronic disease that can be improved by PA, what do
12
13 51 you currently do in terms of delivering PA guidance?
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16
17 52 [Explore who delivers guidance, whether part of standard procedure or ad hoc, whether
18
19 53 content of guidance is general advice or adheres to guidelines; eg motivational interview
20
21

22 54 Q4a. Why this approach;
23

24
25 55 Q4b. What s/he thinks of this approach;
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27

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29 56 Q4c. What individuals/practice could do differently?
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31

32 57 Q4d. What works well and why?
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35 58 Q4e. What needs to change for this to happen?
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39 59 Signposting, etc.].
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42 60 Q5. What do you do differently for those who have chronic disease versus those who
43
44 61 don't in terms of the advice you give for PA guidance?
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47
48 62 Q5a. Given an Example;
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51 63 Q5b. What works well and why?
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54 64 Q5c. What works less well?
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3 65 Q6. What would be your 'top tip' for promoting PA to your patients with chronic disease
4
5 66 and those without?
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9 67 [Explore what they do well and would share with their fellow colleagues as
10
11 68 something that is exemplar practice]
12
13

14 69 Q7. What would help you to deliver the CMO PA guidelines to your patients? Can make
15
16 a note that they haven't seen it- what can help you deliver the guidance. How should
17 70 training be delivered.
18
19 71
20
21

22 72 Prompts if needed: time, resources, partnerships with providers, better training, other
23
24 73 people I could refer to in house, policy commitment for PA promotion
25
26
27

28 74 Q8. What in your opinion are the challenges and barriers that prevent HCPs giving PA
29
30 75 advice?
31
32

33 76 Prompts here-Consider intrinsic and extrinsic
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36
37 77 Q9. How do you engage hard-to-reach HCPs who are less enthusiastic or even anti PA?
38
39

40 78 Q9a. What works why and how?
41
42

43 79 Q9b. What works less well and why?
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46
47 80 Q10. Should we not bother engaging those HCPs who are less enthusiastic, yes or no
48
49 81 and why?
50
51

52 82 EDUCATION
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3 83 Q11. What education /resources out there for HCPs do you feel is most effective at
4
5 84 enabling us to promote the guidelines?
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7

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9 85 [Prompts: The 2019 guidelines Infographics, PA training, Mentoring]
10

11
12 86 What works well and why?
13

14
15 87 What should we do that would help you to see/ access the info.
16

17
18 88 Q12. How can we embed more PA into undergraduate and postgraduate curriculums?
19

20
21
22 89 Consider delivery type/method, scalability, consider assessment
23

24
25 90 Q13. What do you think are the solutions to increase HCP giving PA advice?
26

27
28 91 Consider policy, motivating practices, clinicians
29

30
31
32 92 RESOURCES AND INTERVENTIONS
33

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35 93 2019 Guidelines
36

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38 94 Q14. Do you think the 2019 update has been helpful or not?
39

40
41
42 95 Q14a. Why is this?
43

44
45 96 Q15. Have you seen the CMO PA infographics? If so which ones?
46

47
48 97 Q15a. If yes- how do you use it?
49

50
51
52 98 Where would you find it?
53

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55 99 Q16. What else would you like to see in the guidelines?
56

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2
3 100 [Prompts: 24 hour message, inclusion of guidelines on sleep and PA, specific
4
5 101 diseases, other groups?] anything you'd want adding? Do you think there's any value in
6
7
8 102 adding...

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10
11 103 Q17. What other action or resources should accompany the implementation of the CMO
12
13 104 PA guidelines?

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15
16 105 [Prompts: CMO PA Guidelines communication strategy, A campaign with TV,
17
18 106 radio, social media advertising, Better resourcing to support the campaign, Inclusion of
19
20 107 communication experts on different platforms, Coordinated approach with other health
21
22 108 issues]

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27 109 Q18. Do you use any other PA related guidelines?

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30 110 Yes/No... Why?

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33 111 Moving Medicine (MM)

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36 112 Q19. Do you know about MM? (yes/no)

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40 113 MM is an online suite of resources that provide time specific consultations for HCP
41
42 114 across 11 conditions

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44
45 115 Q20. Do you currently use MM resources? (yes/no)

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47
48 116 Q20a. If you do use it, how do you use it?

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52 117 Q20b. If you don't use it, why not?

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55 118 Q21. What works well and why?

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3 119 [Prompts: Content, coverage, access, style?]
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6 120 Q22. What does not work well and why?
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10 121 [Prompts: Content, coverage, access, style?]
11
12

13 122 Q23. In your opinion what could be improved about moving medicine to make it more fit
14

15 123 for your purpose as a clinician?
16
17

18 124 COVID-19
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22 125 Q24. Has COVID-19 changed the frequency or way you given PA advice?
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24

25 126 Q25. If you are giving PA advice during COVID-19 can you give an example of where and
26

27 127 how and why you have given PA advice?
28
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31 128 Q26. Are you currently giving any specific advice to reduce sedentary behaviour during
32

33 129 covid?
34
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36 130 Q27. Are you targeting any specific groups?
37
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39 131 Q28. Can you give an example of where you have done this? Eg educating, asking qu's.
40

41 132 do you bring this up in conversation.
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45 133 OTHER
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48 134 Q29. What are your thoughts about the current process where rehab typically stops after
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51 135 Band 6?
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136 Q30. Is there anything else that you would like to add about delivering PA before we finish
137 or anything you have not said?

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SRQR checklist

	Reporting item	Line number
Title (#1)	Concise description of the nature and topic of the study identifying the study as qualitative or indicating the approach (e.g. ethnography, grounded theory) or data collection methods (e.g. interview, focus group) is recommended	6-8
Abstract (#2)	Summary of the key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results and conclusions	25-49
Introduction		
Problem formulation (#3)	Description and significance of the problem /phenomenon studied: review of relevant theory and empirical work; problem statement	67-101
Purpose or research question (#4)	Purpose of the study and specific objectives or questions	101-104
Methods		
Qualitative approach and research paradigm (#5)	Qualitative approach (e.g. ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g. postpositivist, constructivist / interpretivist) is also recommended; rationale. The rationale should briefly discuss the justification for choosing that theory, approach, method or technique rather than other options available; the assumptions and limitations implicit in those choices and how those choices influence study conclusions and transferability. As appropriate the rationale for several items might be discussed together.	128-151
Researcher characteristics and reflexivity (#6)	Researchers' characteristics that may influence the research, including personal attributes, qualifications / experience, relationship with participants, assumptions and / or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results and / or transferability	125-128
Context (#7)	Setting / site and salient contextual factors; rationale	134-136
Sampling strategy (#8)	How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g. sampling saturation); rationale	116-124
Ethical issues pertaining to human subjects (#9)	Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues	110-111, 119-120

Data collection methods (#10)	Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources / methods, and modification of procedures in response to evolving study findings; rationale	129-138
Data collection instruments and technologies (#11)	Description of instruments (e.g. interview guides, questionnaires) and devices (e.g. audio recorders) used for data collection; if / how the instruments(s) changed over the course of the study	129-138
Units of study (#12)	Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results)	159-168 (results)
Data processing (#13)	Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymisation / deidentification of excerpts	136-139
Data analysis (#14)	Process by which inferences, themes, etc. were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale	141-157
Techniques to enhance trustworthiness (#15)	Techniques to enhance trustworthiness and credibility of data analysis (e.g. member checking, audit trail, triangulation); rationale	146-152
Results/findings		
Syntheses and Interpretation (#16)	Main findings (e.g. interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory	171-249
Links to empirical data (#17)	Evidence (e.g. quotes, field notes, text excerpts, photographs) to substantiate analytic findings	190-192, 201-203, 213-214, 233-235, 248-249
Discussion		
Intergration with prior work, implications, transferability and contribution(s) to the field (#18)	Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application / generalizability; identification of unique contributions(s) to scholarship in a discipline or field	251-376, 395-408
Limitations (#19)	Trustworthiness and limitations of findings	377-394
Other		
Conflicts of interest (#20)	Potential sources of influence of perceived influence on study conduct and conclusions; how these were managed	439-440

Funding (#21)	Sources of funding and other support; role of funders in data collection, interpretation and reporting	441-442
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