

# Recommending yoga for health: A survey of perceptions among healthcare practitioners in the UK

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## ARTICLE INFO

### Keywords:

Yoga for health  
Healthcare practitioners  
COM-B model  
Perceptions

## ABSTRACT

**Background:** Yoga has the potential to support patients across various health conditions. It is slowly being integrated into healthcare worldwide. While healthcare practitioners (HCPs) are critical to integration, there are currently no studies investigating their perceptions of yoga for health, their openness to recommending yoga to patients, and barriers to doing so. This novel UK study aims to address this.

**Method:** An online survey was conducted among practising UK HCPs. Recruitment was through multi-modal convenience sampling. The COM-B model was used as a framework. Regression analysis examined predictors of HCPs' likelihood to recommend yoga. Open-end responses were analysed through thematic analysis.

**Results:** 198 HCPs were included in the analysis, including general practitioners (GPs, 18.8%), psychologists (18.3%), and nurses/health visitors (14.7%). A high proportion (68.8%) practised yoga at least monthly. The likelihood of recommending yoga to patients was high ( $M = 4.03$ ,  $SD = 0.94$ ; 5-point scale). Older age, not being a GP, and greater capability and motivation significantly predicted a greater likelihood of recommending yoga, explaining 41.4% of the variance ( $p < 0.001$ ). Barriers to recommending yoga were mostly related to the lack of opportunity.

**Conclusions:** HCPs in this study had high levels of personal engagement with yoga and were open to recommending yoga to patients, but still faced several barriers. Workplace support, particularly for GPs, and information about how patients can access appropriate and affordable yoga instruction would facilitate referral. Further research with a representative sample is warranted to understand perceptions of HCPs less engaged with yoga.

## 1. Introduction

Yoga is an ancient Indian philosophy and spiritual practice that has gained popularity in the West as a system of mental and physical health promotion [1]. Modern yoga practice includes physical postures, breathing techniques, relaxation, and meditation [1,2]. A survey among yoga practitioners in the UK indicated that many practitioners engaged with yoga due to perceived or experienced health benefits [2]. As a cost-effective health-supportive practice, yoga is slowly being integrated into mainstream healthcare systems [3]. However, considering its potential benefits, some believe yoga is under-utilised in healthcare [4]. Most practitioners believe that yoga improves physical and mental health, and many use it to help manage medical conditions [2]. The burgeoning research on the use of yoga for health is also encouraging [5, 6]. To promote further use of yoga in healthcare, HCPs are key.

Currently, however, there is a knowledge gap about their receptivity and engagement with yoga for health, which this research aims to address.

A recent bibliometric analysis of systematic reviews assessing the evidence relating to yoga for health indicated a sharp rise in publications over the past decade [5]. This reflects an increased interest in using yoga to prevent and treat medical conditions, with studies showing mostly promising results [6]. Many yoga studies were of low quality [5], however, and could only endorse the potential of yoga to support various conditions. Evidence is stronger for the use of yoga to support the treatment of depression [7–9], stress [10], anxiety [11], lower back pain [12], chronic nonspecific neck pain [13], headaches [14], type 2 diabetes [15,16], and for managing symptoms and quality of life for women with breast cancer [17]. Evidence also suggests benefits for women's health, including during pregnancy [18] and menopause [19]. Yoga is recommended by the American College of Rheumatology for the

*Abbreviations:* GP, General Practitioner; HCP, Healthcare Practitioner; NHS, National Health Service.

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<https://doi.org/10.1016/j.ctcp.2023.101765>

Received 8 January 2023; Received in revised form 14 March 2023; Accepted 1 May 2023

Available online 2 May 2023

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management of osteoarthritis [20] and by the American College of Physicians [21] and the National Institute for Health and Care Excellence [22] as a non-invasive treatment for lower back pain. Additionally, yoga has been found to support health-promoting behaviours, including reduced BMI among those who are overweight or obese [23], smoking cessation [24], healthier eating behaviour and increased physical activity [25], and improved sleep patterns [26].

Various explanations have been proposed as to the potential mechanisms underlying yoga's effectiveness [27]. Most explanations include a shift from the sympathetic nervous system, typically associated with the 'fight or flight' stress response, to the parasympathetic branch, associated with physiological 'rest and digest' activity [27]. Gard et al. [28] theorised that yoga enhances physical and mental health through self-regulatory mechanisms elicited by sustained physical postures, breath regulation, meditation, and ethical principles. They proposed that practising these elements of yoga may improve cognitive, emotional, behavioural, and autonomic outputs through the integration of top-down and bottom-up regulation. Top-down regulation includes high-level cognitive processes such as meta-awareness, attention, intention, and inhibition; the focus of mindfulness and cognitive-based therapies [28]. Bottom-down processes, promoted through breathing and movement practices, have been found to directly influence physiological processes and structures, including increased vagal tone, baroreceptor stimulation, diaphragm strengthening, and enhanced low-level brain networks [28].

While the research and practice of yoga have been progressing and expanding, the integration of yoga into healthcare has been slower. Gupta et al. [29] reported a 7.8% increase in yoga research publications globally between 2007 and 2016. A national survey in the US indicated that the lifetime prevalence of yoga use increased from 9.7% to 13.5% between 2007 and 2012 [30]. However, this study also found a very small proportion (0.2%) practised yoga due to HCPs' recommendation and this proportion declined across the five years. While dated, a nationally representative study of yoga prevalence in England also indicated an increasing trend in recent yoga practice between 1997 and 2008 [31]. A separate nationally representative study in England indicated that only 3% of patients referred by a GP to complementary and alternative medicine (CAM) therapy were referred to yoga compared to 8% of those who self-referred, suggesting under-referral of yoga by GPs [32]. This same study indicated that yoga was underfunded by the UK's National Health Service (NHS) with only 3% of those who benefited from a funded CAM treatment receiving yoga, compared with 9% of those who had to pay themselves. Over the past few years, a movement to integrate yoga into healthcare has been gaining traction [33]. The NHS has acknowledged the need to reduce the burden of disease through effective prevention and has pledged support for integrated care by collaborating with organisations that support health, such as those providing yoga [34].

Referral, specifically through social prescribing, is the main route through which yoga is being integrated into the UK's NHS [3]. Social prescribing promotes the use of voluntary or community services through recommendations from primary care settings [35]. A qualitative evaluation of a yoga program developed for social prescribing within the NHS, Yoga4Health, found the program to be acceptable, even for high-risk patient groups [36]. Participants reported improved physical and mental health, social connection, health self-management, and positive lifestyle changes. Primary-care referral, for example through GPs, has been found to be a foundational step in initiating the social prescribing process [37]. Understanding perceptions of yoga among HCPs will help identify barriers to further incorporating yoga into healthcare. While there have been no studies in the UK investigating this, a study in the US has explored perceptions of yoga among students enrolled in healthcare programs [4]. This study found that while healthcare students were open to referring patients to yoga, their perceptions of the appropriateness of yoga for medical conditions underestimated the potential of yoga when considering the supporting

evidence. A study investigating CAM recommendations and professional use among nurses in Australia suggested low levels, especially for yoga, despite relatively higher personal use and positive attitudes [38]. In contrast, research in the US among rehabilitation professionals indicated that yoga was one of the most used integrative health practices for self-care and patients [39].

The use of theories to understand behaviour is increasingly recognised as important, especially for the development of behaviour change interventions in the complex field of public health [40]. The COM-B model [41] covers a comprehensive range of behavioural influences and is applicable across a wide variety of contexts, including among HCPs [42]. The model recognises that behaviour is generated through the interaction of capability, opportunity, and motivation. Capability refers to an individual's physical and psychological competence to engage in the target behaviour, including knowledge and skills. Opportunity refers to factors external to the individual which facilitate or inhibit the behaviour. Motivation covers a range of mental processes that energise behaviour, including goals, decision-making, habits, and emotions. The COM-B model was used to qualitatively explore barriers and enablers to social prescribing for mental health among GPs [43]. Using this framework, they found that GPs acknowledged the utility of social prescribing to address patients' unmet needs in a de-medicalised way. GPs were enabled by the ability to build trusting relationships with patients and motivated by their positive feedback. The study identified the need for more formal training, a more structured process, and greater workplace support to promote social prescribing. Other studies that have used the COM-B model to understand HCPs' behaviours include referrals to community-based physical activity [44], providing lifestyle-based support for young mothers [45], and delivery of a children's health assessment [46].

Results from a study exploring the integration of CAM, including yoga, into NHS sites across the UK, provide some understanding of barriers and facilitators to using or referring yoga in medical settings [47]. Frequently cited facilitators of effective integration included staff enthusiasm, service setting, patient support, mutual benefit between services, positive results, low/no cost, and high-quality practitioner training, and regulation. While prevalent barriers included issues of funding and costs, negative perceptions of CAM among clinicians, opposition from NHS staff, lack of space, lack of access to patient records, and lack of evidence. Similarly, research in the US found a lack of training, payment issues, and a lack of research funding to be key barriers to the use of CAMs, including yoga, by rehabilitation professionals [39]. Qualitative research among GPs exploring the integration of CAMs into care for comorbid musculoskeletal and mental health conditions indicated that in addition to structural barriers, lack of knowledge about CAMs and philosophical differences between health and healthcare were evident [48]. While this provides some understanding of HCPs' attitudes towards CAM, yoga is perceived by some HCPs as different from CAM [48]. Research among oncologists found they viewed yoga as more aligned with physical activity than CAM [49]. A recent survey of Australian mental health practitioners' attitudes to yoga indicated the need for evidence-based guidelines, training, and workplace resources to support integrating yoga practices into clinical settings [50].

To our knowledge, no study has comprehensively assessed perceptions of and experiences with yoga among a range of HCPs. This study aims to address this gap by assessing UK HCPs' perceptions of yoga for health and their willingness to recommend yoga to patients, including barriers and facilitators to doing so, using the COM-B framework. Based on the research reviewed, it is hypothesised that HCPs will be open to recommending yoga but may experience barriers related to capacity and opportunity. Major barriers are theorised to include a lack of sufficient knowledge about yoga for health and workplace restrictions relating to support, funding, and resource pressures. Medical doctors are expected to be more sceptical due to greater adherence to evidence-based guidelines.

## 2. Materials and methods

This study was approved by the University of Westminster Psychology Ethics Committee and adhered to the STROBE checklist for cross-sectional studies (see supplementary materials A).

### 2.1. Design and recruitment

The study was a cross-sectional mixed-methods survey design. Data was collected through an anonymous online survey hosted on the Qualtrics platform. Multi-modal convenience sampling was used. Recruitment was primarily online through the authors' personal and professional healthcare and yoga networks. Contacts with wide reach supported recruitment – including through yoga, CAM, and medical organisations. Social media recruitment activity was driven primarily through a dedicated Twitter account (@yoga\_survey). Hashtags such as #socialprescribing, #medtwitter, #nursetwitter, and #psychtwitter were used to gain wider attention. Relevant professional network accounts, such as the British Psychological Society, and nursing and GP networks were tagged and asked to retweet. Individual influencers were also approached to complete and share the survey. Printed flyers were additionally distributed at an integrative healthcare conference. Information about the study was posted on a dedicated website ([www.yogaforhealthsurvey.com](http://www.yogaforhealthsurvey.com)). The authors approached a wide range of HCPs to participate and did not target those favourable to yoga, aiming to reach a wider group. A similar multi-modal strategy was found to be acceptable in the recruitment of clinicians [51].

The inclusion criteria for participating in the study were qualified and licensed HCPs, 18 years or older, currently treating patients in the UK. An HCP in the UK is defined as a person providing a healthcare service to a patient. For this study, HCPs included GPs (primary care physicians) and specialist medical doctors, nurses, midwives, and health visitors as well as allied health professions, including psychologists, dietitians, physiotherapists, osteopaths, chiropractors, and occupational therapists. Those who could not read English and participants identifying their main healthcare profession as yoga teachers or therapists were excluded. All participants gave informed consent. The data were collected over three months between April and June 2022.

### 2.2. Materials

The authors, who are both knowledgeable about yoga for health, designed the questionnaire. Relevant literature was reviewed to inform the questions. An industry leader in yoga for health, a general practitioner, and a psychologist were consulted to review the questionnaire for face and content validity. The questionnaire included 26 questions. Socio-demographic questions included: age, gender, ethnicity, profession, relevant specialism, place of work, and years of professional practice. Personal experience with yoga was measured by asking whether participants had ever practised yoga and, if they had, whether they were currently practising yoga. If they were current practitioners, they were asked how frequently they practised ('monthly or less often', 'several times a month', 'once a week', or 'several times a week'). Participants were also asked whether they had previously or were currently engaged in yoga training and, if they had/were, what type (teacher training, yoga therapy training, short training courses). Willingness to recommend yoga was measured on a 5-point Likert scale ('Very likely' to 'Very unlikely'), including 'Not applicable', and was asked for nine conditions, such as musculoskeletal, mental health, and cancer. A numeric open-end question was included to determine the number of patients, if any, participants had recommended yoga to in the past month. A question about perceived barriers to and facilitators of referral to yoga in healthcare related to capabilities, opportunities, and motivations (the COM-B scale). This COM-B scale included 18 statements rated on a 5-point Likert scale from 'strongly agree' to 'strongly disagree'. The statements were developed from reviewing the existing

literature including a qualitative study that used the COM-B model to assess social prescribing among GPs [43] and a study about the perceived acceptability of yoga among HCP students in the US [4]. Based on the authors' judgements, five statements were classified as relating to capability, such as 'I am knowledgeable about the use of yoga for health' and 'I am familiar with research about yoga for health'. Six statements were grouped under opportunity, such as 'My workplace supports yoga in healthcare' and 'Other practitioners in my workplace recommend yoga to patients'. The remaining seven statements were considered most related to motivation, such as 'I am concerned about the lack of evidence-based guidelines for yoga for health' and 'Yoga empowers patients to take control of their health'. Eight of the statements were phrased negatively and reverse-scored in the analysis.

### 2.3. Procedure

After reviewing the project information, consenting participants were asked to complete a 10-min online anonymous survey. At the end of the survey, participants were invited to enter a prize draw of £50. If they chose to participate in the draw, they were directed to a separate website to submit their email address. On completion of the survey, participants were thanked and provided with contact details for the authors in case of feedback, questions, or comments.

### 2.4. Analysis

SPSS software was used to analyse the quantitative data. Respondents whose stated profession was not within the inclusion criteria (for example, yoga teachers or yoga therapists) were removed from the dataset. Missing data were determined to be missing at complete random and were handled through listwise deletion since power was adequate. Descriptive statistics were used to analyse the socio-demographic characteristics of the sample and responses to the questions. Healthcare professions were grouped into GPs, other medical doctors, nurses/health visitors/midwives, psychologists, physiotherapists/osteopaths/chiropractors, and others (including mostly dietitians, nutritional therapists, and occupational therapists) for more robust subgroup samples. Participants were classified as current yoga practitioners if they reported having practised yoga at least monthly as a comparison to those classified as not current practitioners, who indicated they had never practised yoga or practised less often than monthly. An exploratory factor analysis was run on the COM-B scale to determine subscales for analysis. Respondents who had more than one missing and/or 'not applicable' response were removed from the subscales. Respondents who had more than two missing and/or 'not applicable' responses were removed from the overall COM-B scale. T-tests and ANOVA were used to determine differences across key healthcare professional groups and between those currently and not currently practising yoga.

Healthcare profession groups and current yoga practice variables were transformed into dummy variables for the regression analyses [52]. A hierarchical multiple regression with a direct 'enter' method tested predictors of HCPs' likelihood to recommend yoga. Assumptions for running a multiple regression analysis were checked. The sample size was considered adequate for testing nine independent variables [53]. The independence of observations and low multicollinearity were confirmed. The assumptions of normality, linearity and homoscedasticity were considered acceptable as indicated by the histogram of standardised residuals, the normal p-p plot of standardised residuals, and the scatter plot [54].

The open-ended questions were analysed using an inductive-deductive approach to thematic analysis. The open responses were entered and analysed in an Excel spreadsheet. Initially, the primary author adopted an inductive approach; reading through the responses to become familiar with the data, developing initial codes, and then confirming the codes through repeated review of the data [55]. The author

then compared the codes to the 18 theory-based statements included in the COM-B scale related to barriers and facilitators of yoga recommendations. Triangulation of the quantitative COM-B data and qualitative codes was applied at the interpretation stage of the analysis to determine converging, complementary or contradictory themes [56]. At this stage the second author read through the raw data and reviewed the coding framework and thematic structure. Both authors discussed any discrepancies in coding or interpretation and agreed the final codes and thematic structure.

### 3. Results

248 healthcare practitioners responded to the survey, 246 consented to participate and 198 met the inclusion criteria and specified their healthcare profession in the first question. Ninety per cent of participants completed the survey.

#### 3.1. Socio-demographic characteristics

The sample characteristics are presented in Table 1. General practitioners, psychologists, and nurses/health visitors were more likely to have participated. Most respondents were female (83.7%) and white (87.6%), reflecting a sample more inclined to engage with yoga [2]. A range of age groups was represented with most between the ages of 25 and 64 years old.

#### 3.2. Engagement with yoga

Almost all respondents had practised yoga before (96.8%) and the majority practised at least monthly (68.8%). Among those who practised yoga at least monthly, 38.5% had done yoga training, including yoga teacher training, yoga therapist training and/or short yoga training courses. While a nationally representative comparison is not available, these sample characteristics indicate much higher engagement with yoga than levels found in the general UK population [31]. Most (92.2%) claimed to use at least one yoga-related technique with their patients, with the most used techniques being breathing practices (72.6%), meditation/mindfulness (58.1%), and relaxation (54.8%). Yoga was perceived primarily as a mind-body therapy (87.6%) and was least associated with CAM (33.7%). Considering overall engagement with yoga, knowledge of the difference between yoga and yoga therapy was relatively low (41.0%). As was familiarity with accredited yoga programs, such as Yoga4Health (27.5%).

#### 3.3. Likelihood of recommending yoga to patients

Fig. 1 displays participants' responses to the likelihood to recommend yoga across health conditions. More than half indicated they were somewhat or very likely to recommend yoga across each of the conditions. HCPs were most likely to recommend yoga for mental health (92.2%) and musculoskeletal conditions (84.5%) and least likely to recommend yoga to those with respiratory conditions (59.7%) and cancer (56.3%).

A mean score for the likelihood of recommending yoga to patients was created from responses across a maximum of the nine conditions, as relevant to the HCP. Table 2 presents the mean scores at a total level and across healthcare professions and current yoga practice. One-way analysis of variance revealed a statistically significant difference between healthcare professions ( $F(5,179) = 5.353, p < 0.001$ ). A Tukey post hoc test indicated that nurses/health visitors/midwives, psychologists, and 'other' HCPs were statistically significantly more likely to recommend yoga to patients than GPs ( $p < 0.001, p = 0.011, \text{ and } p = 0.003$  respectively). There were no statistically significant differences between the other HCP groups ( $p > 0.05$ ).

HCPs who were currently practising yoga were significantly more likely to recommend yoga to patients than those who were not ( $t$

**Table 1**

Socio-demographic characteristics of the total sample, current yoga practitioners (practising at least monthly), and not current yoga practitioners.

Variables	Per cent* (n)		
	All	Current yoga practitioners	Not current yoga practitioners
Healthcare profession	n = 197	n = 130	n = 59
General practitioner	18.8 (37)	16.9 (22)	22.0 (13)
Specialist doctor	7.6 (15)	7.7 (10)	8.5 (5)
Nurse/health visitor	14.7 (29)	16.9 (22)	10.2 (6)
GP nurse	3.0 (6)	2.3 (3)	3.4 (2)
Midwife	1.5 (3)	2.3 (3)	0.0 (0)
Physician associate	0.5 (1)	0.8 (1)	0.0 (0)
Psychologist	18.3 (36)	16.9 (22)	22.0 (13)
Osteopath	4.6 (9)	3.8 (5)	6.8 (4)
Chiropractor	0.5 (1)	0.8 (1)	0.0 (0)
Physiotherapist	8.1 (16)	5.4 (1)	13.6 (8)
Dietitian/nutritional therapist	3.0 (6)	3.8 (5)	1.7 (1)
Occupational therapist	4.1 (8)	4.6 (6)	3.4 (2)
Other	15.2 (30)	17.7 (23)	8.5 (5)
Age	n = 178	n = 121	n = 54
18–24	1.1 (2)	0.8 (1)	1.9 (1)
25–34	15.2 (27)	10.7 (13)	25.9 (14)
35–44	39.3 (70)	40.5 (49)	38.9 (21)
45–54	25.8 (46)	25.6 (31)	24.1 (13)
55–64	17.4 (31)	21.5 (26)	7.4 (4)
65 or older	1.1 (2)	0.8 (1)	1.9 (1)
Gender	n = 178	n = 121	n = 54
Male	16.3 (29)	13.2 (16)	24.1 (13)
Female	83.7 (149)	86.8 (105)	75.9 (41)
Ethnicity	n = 178	n = 121	n = 54
White	87.6 (156)	86.0 (104)	94.4 (51)
Mixed/Multiple ethnic groups	3.4 (6)	4.1 (5)	1.9 (1)
Asian/Asian British	6.2 (11)	6.6 (8)	3.7 (2)
Black/African/Caribbean/Black British	1.7 (3)	1.7 (2)	0.0 (0)
Other	1.1 (2)	1.7 (2)	0.0 (0)

(83.816) = 4.130,  $p < 0.001$ ). Two-way ANOVA revealed no significant interaction effect for current yoga practice by healthcare profession ( $F [5168] = 1.794, p = 0.117$ ).

#### 3.4. Capability, opportunity, and motivation (COM-B) to recommend yoga

##### 3.4.1. Determining dimensions

Factor analysis using principal components analysis with varimax rotation indicated five factors with Eigenvalues above 1.0, accounting for 60.5% of the variance. Three subscales were created considering these factors, correlation analysis, and constructs informed by the Theoretical Domains Framework and COM-B model [57]: (1) capability scale, including six items, (2) opportunity scale, including five items and (5) motivation scale, including seven items (see Fig. 2; see

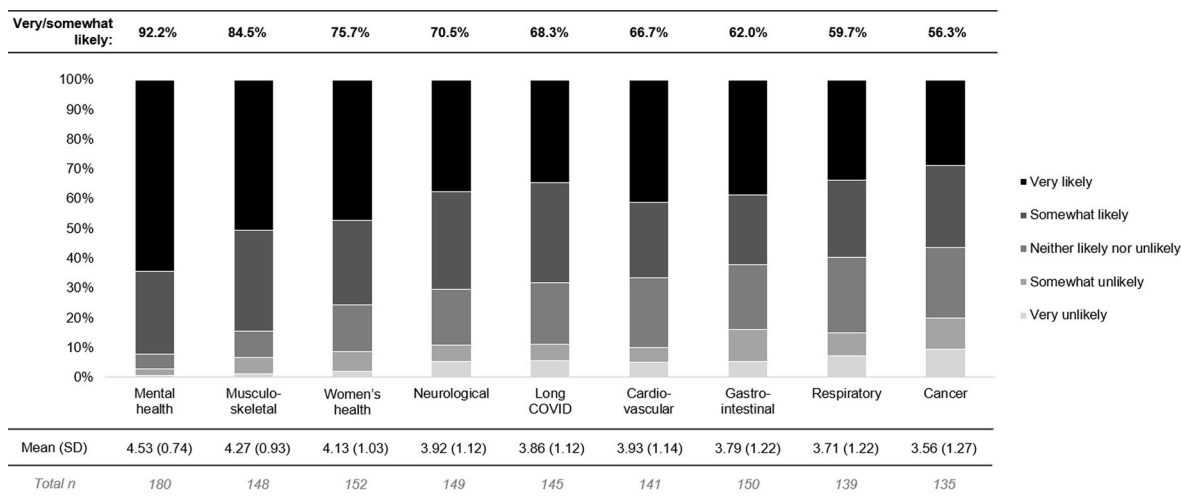


Fig. 1. Likelihood to Recommend Yoga to Patients Across Conditions. Note. Excludes 'not applicable' responses.

Table 2

Mean likelihood of recommending yoga to patients across healthcare professions and yoga practitioner status.

Variables	n	Mean	Standard deviation
All Healthcare profession	185	4.03	0.94
General practitioner	37	3.42	1.03
Specialist doctor	15	3.84	1.26
Nurse/health visitor/midwife	39	4.44	0.79
Psychologist	36	4.13	0.85
Physio/Osteo/Chiro	26	4.03	0.66
Other	44	4.19	0.84
Yoga practitioner status			
Current yoga practitioner	130	4.22	0.82
Not current yoga practitioner	59	3.56	1.06

Based on mean rating on a scale of (1) Very unlikely, (2) Somewhat unlikely, (3) Neither likely nor unlikely, (4) Somewhat likely, (5) Very likely across nine conditions.

supplementary materials B for factor loadings and comparison of original and final subscale classifications).

3.4.2. Scale reliability

Cronbach's  $\alpha$  coefficients indicated acceptable reliability: 0.71 for the capability scale, 0.64 for the opportunity scale, and 0.62 for the motivation scale. The reliability of the overall COM-B scale including all items was good, with a Cronbach's  $\alpha$  coefficient of 0.80.

3.4.3. Descriptive analysis of the COM-B subscales

Fig. 3 shows agreement across the individual items of the capability,

opportunity, and motivation subscales ordered by the loading on the factor most associated with the subscale (see supplementary materials B). Agreement on the motivation scale items was high for positively phrased items, especially for addressing patients' needs holistically by recommending things like yoga, perceptions of yoga as an empowering practice for patients, and the potential for yoga to support patients' unmet needs. There was low agreement for concerns about patient safety and negative experiences with and/or feedback about yoga for health. The capability scale had the highest agreement for knowledge about the use of yoga for health. Few were uncertain about the benefits of yoga despite more than half not being familiar with the research about yoga for health. Very few HCPs agreed that they were too busy to be concerned with how yoga might help patients. HCPs' agreement was highest on the opportunity scale for resource pressures being a barrier to engagement and the cost of yoga for patients. Workplace support was relatively lower, and two-thirds of HCPs lacked information about access to appropriate yoga instruction for patients.

A repeated measures ANOVA with a Greenhouse-Geisser correction was run to determine whether there were differences in the mean scores for the capability, opportunity, and motivation subscales. Statistically significant differences ( $F(1.829, 230.498) = 197.131, p < 0.001$ ) were present. Post hoc analysis with a Bonferroni adjustment showed that differences across all three subscales were statistically significant; motivation had the highest mean score ( $M = 4.03, SD = 0.42$ ), then capability ( $M = 3.54, SD = 0.69$ ), and lastly opportunity ( $M = 2.79, SD = 0.67$ ).

3.5. Predicting the likelihood of recommending yoga to patients

A hierarchical regression model to predict HCPs' likelihood to recommend yoga to patients was performed (see Table 4 for a summary

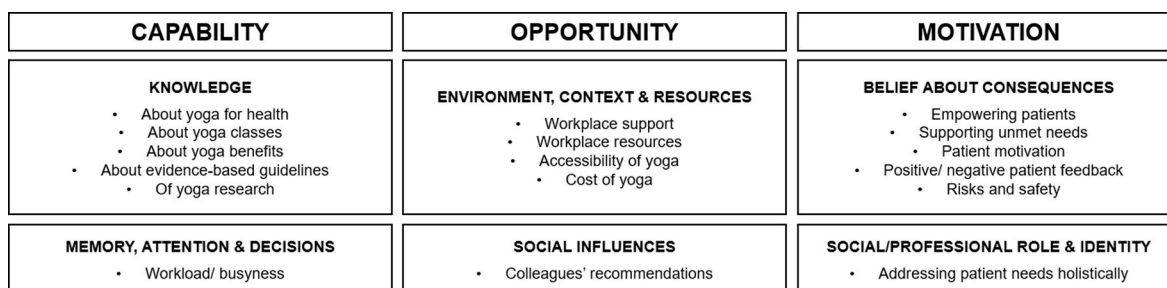


Fig. 2. Summary of the capability, opportunity, and motivation subscale components.

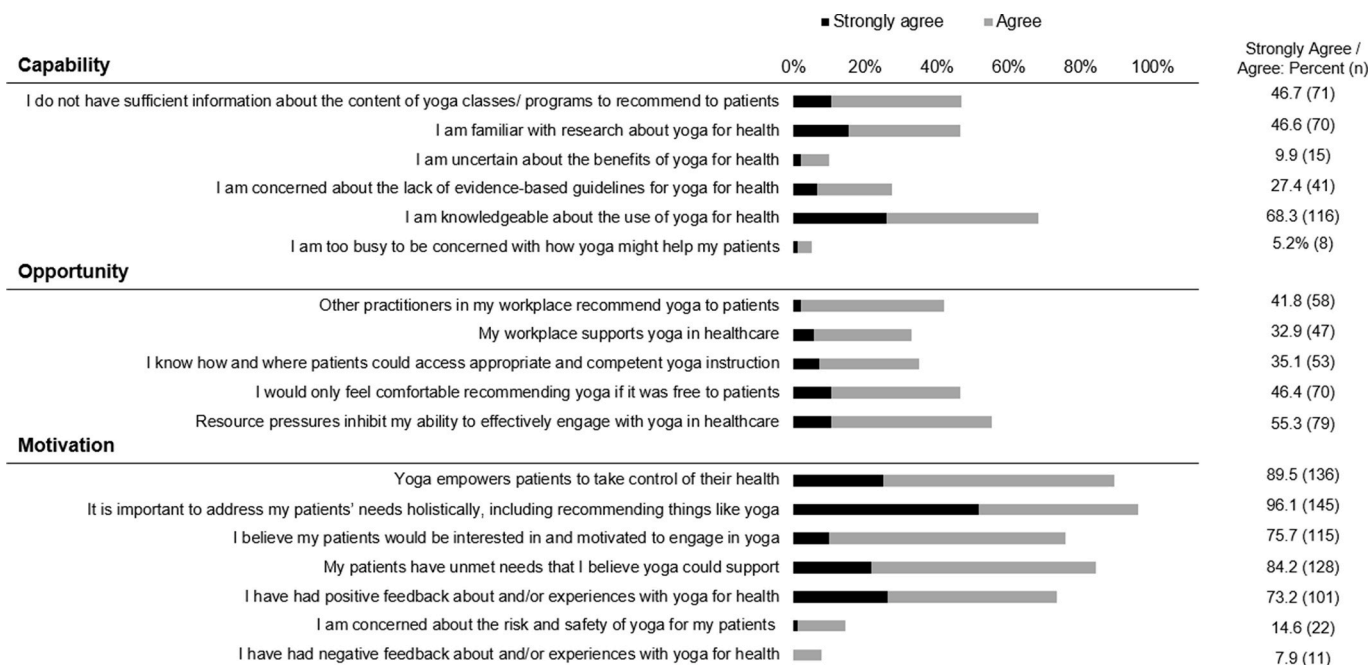


Fig. 3. Agreement on the Capability, Opportunity, and Motivation Subscale Items. Note. Subscale items are ordered by factor loading on the strongest factor for the subscale.

of the results). Age and the primary professions of interest – GPs, other specialised medical doctors, nurses/health visitors/midwives, and psychologists – were included as independent variables in the first step, current yoga practice in the second step, and the three COM-B subscales (capacity, opportunity, and motivation) in the final step. The first step of the model indicated that age and profession contributed significantly ( $F(5,119) = 8.415, p < 0.001$ ), accounting for 23.0% of the variance. Significant predictors included being older, which was positively associated with the likelihood to recommend, and being a GP, which was negatively associated with the likelihood to recommend. Adding the current yoga practice variable at step 2 explained an additional 5.4% of variance, contributing significantly to the model ( $F(6,118) = 9.049, p < 0.001$ ). The significant predictors from the first step held and additionally currently practising yoga was significantly and positively associated with the likelihood to recommend. The capability, opportunity, and motivation subscales were entered in the final step of the regression model contributing significantly with an additional 14.1% of variance explained ( $F(9,115) = 10.720, p < 0.001$ ). The capability and motivation subscales were additional significant predictors and positively associated with the likelihood to recommend yoga. Overall, the model explained 41.4% of the variance. Being older and having higher scores on the capability and motivation subscales were significant, positive predictors of likelihood to recommend while being a GP was a

significant, negative predictor.

### 3.6. Qualitative themes

Qualitative themes from the two open-ended questions – ‘What would make you more likely to recommend yoga to patients?’ and ‘Is there anything more you would like to say about the role of yoga in healthcare?’ – aligned well with the capability, opportunity, and motivation subscales (see supplementary materials C). In terms of what would make HCPs more likely to recommend yoga to patients, qualitative responses were mostly related to opportunity and capability. This aligns with the quantitative finding that motivation among participants was high and that barriers were predominately related to opportunity and capability.

#### 3.6.1. Capability

Responses highlighted the need for a better understanding of the benefits of yoga, robust supporting evidence, and evidence-based guidelines for yoga. HCPs expressed an interest in understanding the evidence and benefits of yoga, especially in relation to specific conditions:

Table 4

Results of hierarchical regression models predicting likelihood to recommend yoga from age, healthcare profession, current yoga practice, and the capability, opportunity, and motivation subscales.

Yoga recommendation outcomes	Step 1: Age and profession adjusted R <sup>2</sup>	Step 2: Current yoga practice Δ R <sup>2</sup>	Step 3: COM-B subscales Δ R <sup>2</sup>	Final adjusted R <sup>2</sup>	Significant predictors	B	SE B	β	t	P value
Likelihood to recommend	0.230**	0.054**	0.141**	0.414**	Age	0.225	0.075	0.228	3.016	0.003
					GPs	-0.608	0.204	-0.267	-2.985	0.003
					Capability	0.451	0.122	0.330	3.685	<0.001
					Motivation	0.397	0.193	0.178	2.060	0.042

Note. The predictor variables included in the model were: (1) age (18–24 years old = 1, 25–34 years old = 2, 35–44 years old = 3, 45–54 years old = 4, 55–64 year old = 5, 65+ years old = 6), (2) healthcare profession: general practitioner (no = 0, yes = 1), (3) healthcare profession: specialist medical doctor (no = 0, yes = 1), (4) healthcare profession: nurse or midwife (no = 0, yes = 1), (5) healthcare profession: psychologist (no = 0, yes = 1), (6) not currently practising yoga = 0, currently practising yoga = 1, (7) capability scale (mean), (8) opportunity scale (mean), (9) motivation scale (mean).

\* $p < 0.05$ ; \*\* $p < 0.001$ .

“Publication of more evidence-based research of benefits of yoga for mental health in a diverse range of population groups.” [Psychologist, 35–44 years]

Participants cited inclusion in the NICE guidelines and evidence-based protocols as a key consideration for recommending:

“Given how valuable it is to so many people, it should definitely be made available in healthcare. However, standardisation is likely necessary for it to be accepted.” [GP, 35–44 years]

HCPs indicated that familiarity with yoga teachers and confidence in their training and capabilities relating to yoga for health would make them more likely to recommend yoga:

“Yoga is a very broad spectrum, and often unsuitable for a patient due to unknown training of teachers. It is easier to recommend Pilates or yoga teachers I know personally.” [Osteopath, 35–44 years]

A couple of participants highlighted a need for formal training on yoga for health among HCPs:

“Training/study session focusing on the benefits of yoga in addition how the session can be tailored to individual need.” [Physiotherapist, 35–44 years]

A predominant theme, not captured in the quantitative research, was that HCPs’ decision to recommend yoga was patient-led or guided by patient interactions. The verbatim suggested that the HCPs’ decision to recommend yoga is influenced by perceptions of the patient’s suitability and interest in yoga. One respondent explained:

“I would always explore the patient’s receptivity to a modality such as yoga in the first instance. Very often our patients have explored it themselves, in which case I would guide them to a specific practice/method.” [Physiotherapist, 55–64 years]

Another clarified:

“I don’t make recommendations, but I do encourage clients to consider their options and find what works for them, including yoga.” [Psychotherapist, 55–64 years]

Relatedly, one HCP mentioned the need to educate patients about the benefits and dispel any fears around safety:

“Patients are uncertain and anxious about yoga and need to be made more aware of the benefits.” [Haematologist doctor, 45–54 years]

### 3.6.2. Opportunity

Accessible yoga for patients was the most prominent theme relating to the opportunity to recommend yoga. Accessibility related to the location, cost, and content of yoga classes. In response to what would make them more likely to recommend, participant comments included:

“Easy access, yoga for health population and not yoga studio yoga.” [Psychologist, 45–54 years]

“If there were more easy-to-access yoga programmes/courses online. E.g., ‘yoga for anxiety.’” [Psychologist, 35–44 years]

“Knowing where accessible and affordable yoga classes are and/or if the emphasis of the yoga class is aimed at promoting mental health.” [Nurse/health visitor, 55–64 years]

Many HCPs recognised the need for specialised yoga classes for patient groups and conditions:

“More NHS free access for yoga in blood cancer patients.” [Haematologist doctor, 45–54 years]

“Stroke-specific classes.” [Physiotherapist]

“A yoga program designed for Care Home residents.” [Nurse/health visitor, 55–64 years]

HCPs expressed a need for yoga programs recognised or recommended by the NHS and other professional bodies. This was often linked to the need for funding and cost barriers for patients. One participant explains what would make them more likely to recommend yoga:

“Recognised programmes for diagnoses in the NHS. I work with a lot of working class and people in poverty. Accessibility for these types of interventions is also a massive issue, it needs to be affordable and in easy-to-access locations for small, working communities and council estates.” [Psychologist, 25–34 years]

Some HCPs also mentioned the need for a structured system of referral:

“Reduced cost for them. Structured system to refer to rather than just saying have a look for someone local.” [Physiotherapist, 45–54 years]

Participants expressed an opportunity for increasing awareness of and support for yoga in their workplace:

“I recommend ‘exercise’ or meditation to patients rather than specifics. I think if there was more awareness at work or adverts for yoga4health I would be more likely to suggest it.” [GP, 35–44 years]

Some HCPs also expressed support for greater integration of yoga into the mainstream healthcare system:

“I think it will be a wonderful offering within the NHS when we can roll it out the way it has been done in Sweden.” [Physiotherapist, 55–64 years]

### 3.6.3. Motivation

Concerning their motivation for recommending yoga, qualitative responses indicated the benefits that HCPs believed yoga could offer to patients:

“I think that yoga can play an important role in the health and wellbeing of patients. From a musculoskeletal practitioner’s viewpoint, I feel that yoga is a form of movement that is very accessible for many of my patients and that the benefits go way beyond just the physical.” [Osteopath, 35–44 years]

First-hand experience of the benefits motivated some HCPs to recommend yoga:

“Knowing the benefits I experience from regular yoga practice; I feel able to encourage my patients to try yoga.” [GP nurse, 55–64 years]

A couple of HCPs expressed concern about yoga stereotypes in recommending yoga to patients as a barrier to engagement:

“Perception is that it’s a middle-class mystical thing and not accessible to ordinary people.” [GP, 55–64 years]

## 4. Discussion

Given the increase in yoga practice and research over the past decade, this novel research sought to understand HCPs’ perceptions of yoga for health and their propensity to recommend yoga to patients. HCPs who participated in this study were open to referring patients to yoga and motivated to engage with yoga for health. This may in part reflect HCPs’ personal experience and knowledge of yoga given the high level of yoga participation in this sample. External factors, relating to opportunities to provide such recommendations, tended to be the greatest barriers to recommending yoga. This includes workplace barriers and knowledge of where patients can access appropriate yoga instruction. Regression analysis revealed that being older, not being a GP,

and having increased capability and higher motivation to recommend yoga significantly predicted a greater likelihood of recommending yoga.

The findings that older HCPs were more likely to recommend yoga may be linked to clinical experience and their confidence in engaging in such conversations. This aligns with Wen et al. [39]'s findings that senior rehabilitation professionals in the US were more likely to initiate discussions about integrative health practices such as yoga than junior rehabilitation professionals. The finding that GPs were less likely to recommend yoga to patients may indicate that they experience more barriers, as outlined in the subsequent sections. Qualitative research exploring barriers to social prescribing among GPs in the UK support this position [43]. HCPs were most likely to recommend yoga for mental health and musculoskeletal issues and least likely to recommend yoga for cancer and respiratory conditions. This aligns with findings that healthcare students in the US considered yoga more appropriate for skeletal and psychological symptoms than physical symptoms, despite the supporting evidence [4]. Previous research has highlighted personal experiences with yoga or CAM to be a key predictor of the likelihood to recommend it [4,39,58]. In this study, however, having a current yoga practice did not contribute significantly to the final predictive model of the likelihood to recommend yoga due to the greater explanatory power of the capability and motivation subscales. This may be due to most participants in this study having had some past engagement with yoga and overall, a relatively high level of involvement.

#### 4.1. Capability to recommend yoga

The findings that HCPs' knowledge and decision-making processes were important in recommending yoga resonate with findings from previous studies. A qualitative study exploring barriers and facilitators for HCPs referring patients to a physical activity group in Scotland found knowledge and memory, attention, and decision-making processes to be key sub-themes of capability [44]. They found that a lack of knowledge about community-based physical activity options was a key barrier to recommendation. Similarly, previous studies have found a lack of knowledge about yoga and other CAMs among HCPs, highlighting the need for more training [38,50,59,60]. The main conclusion from a systematic review of nurses' knowledge and use of CAMs, including yoga, highlighted the need for educational programs to support greater integration into clinical settings [61]. Most HCPs in the present study claimed to be knowledgeable about yoga for health, however, fewer knew the difference between yoga and yoga therapy, arguably an important distinction when considering yoga for patients with specific conditions. This aligns with previous research findings that HCPs lacked an understanding of yoga therapy, limiting its' integration into healthcare [29]. Additionally, fewer HCPs were knowledgeable about where patients could access appropriate yoga instruction and a minority were familiar with accredited yoga for health programs suggesting an opportunity for embedding deeper knowledge about yoga for health.

The implementation of evidence-based practice by HCPs has historically been a challenge in the UK. While dated, a study by McColl et al. [62] found low awareness and usage of research sources, including journals, review publications, and databases such as Cochrane, among GPs in the UK. Familiarity with yoga research was higher than expected in this study, due to respondents having high engagement and experience with yoga. However, more than half of the participants were not familiar with yoga research. Given the importance of evidence-based practice [63], this is considered a key barrier to yoga recommendation. Other studies have highlighted a perceived lack of scientific research as influential on HCPs' perceptions of CAMs [39,49]. Relatedly, as for other studies [50], a lack of evidence-based guidelines to support HCPs' recommendations or professional use of yoga was a barrier.

In addition to consideration of research and guidelines, implementation of evidence-based practice requires consideration of the HCP and patient preferences [64]. Wen et al. [39] found rehabilitation professionals used a combination of scientific evidence, clinical experience,

and an understanding of the patient's orientation and preferences when recommending CAM. Qualitative research by Carstairs et al. [44] found that HCPs' real-time decision-making process of recommending physical activity was patient-driven and influenced by the patient-HCP interaction and rapport. While a patient-led decision-making process was not captured quantitatively in the present study, it emerged as an important theme in the qualitative results. Research among GPs in the UK identified a need for training to develop interpersonal skills for effective decision-making about patients' needs and how social prescribing might support them [43]. The qualitative findings suggest this may also be important to help HCPs identify appropriate opportunities for recommending yoga.

Being too busy to engage with how yoga might help patients was not a barrier for most participants. Previous studies have found a lack of time to be a barrier to HCPs' ability to refer patients to physical activity groups [44], promote healthy behaviours among young mothers [45], and advise on CAM [48]. However, this was more related to having limited time to build relationships with patients for appropriate referral and competing priorities than not being engaged with the potential intervention. Previous research indicated that GPs found it challenging to build the trust required for social prescribing in the standard 10-min consultations with patients [43]. This links to a healthcare system under pressure which will be explored more in the next section.

#### 4.2. Opportunity to recommend yoga

The opportunity subscale did not significantly predict the likelihood to recommend yoga. One explanation for this may be that the criterion variable, the likelihood to recommend yoga, was hypothetical rather than directly linked to HCPs' actual behaviour and, as such, factors outside of the individual were less considered when responding. In this study, opportunity encompassed environmental, contextual, and resource factors as well as social influences [57]. Endorsement across the opportunity statements was lower than for the capability and motivation statements highlighting the prevalence of external barriers to recommending yoga.

Findings suggested relatively low workplace support for yoga, aligning with qualitative research by Sharp et al. [48]. They found that structural barriers were a major constraint for CAM integration into the NHS. Having the support or endorsement of their workplace emerged as a prevalent theme in the qualitative data with many HCPs indicating that endorsement of yoga programs by the NHS or professional bodies would make them more likely to recommend it. HCPs were conscious of resource pressures within the NHS and healthcare settings, which was seen as a barrier to recommending yoga. This aligns with other UK studies among HCPs, indicating that engagement with social prescribing and providing lifestyle advice or support is often deprioritised to provide more essential short-term healthcare [43,45]. Conversely, there was also the recognition that these activities might help with healthcare pressures in the longer term [43].

The cost of yoga emerged as a barrier to recommending it. The quantitative findings indicated nearly half of the participants would only feel comfortable recommending yoga if it were free for patients. Qualitative responses revealed that HCPs were conscious of the financial pressures on many patients and believed the cost of yoga made it inaccessible. Costs and payment arrangements were found to be a major barrier to the use of integrative health practices, such as yoga, among rehabilitation professionals in the US [39]. In the UK, Sharp et al. [48] highlighted evidence of the cost-effectiveness of CAM practices, including yoga, to be an important facilitator of integration into mainstream healthcare. Additionally, previous research suggests that GPs may be hesitant to refer patients to community groups due to the precarious nature of funding, which often led to their transitory nature [43]. While this concern was not directly addressed in this research, it may link to concerns about the accessibility of appropriate yoga instruction for patients.



The salience of and access to appropriate yoga instruction for patients was found to be a barrier linked to the opportunity to recommend yoga. The qualitative findings highlighted the need for greater access to specialised yoga classes to support specific patient groups and conditions. Some participants suggested that a more formalised system of referral may make them more likely to recommend yoga. Previous research among GPs found collaboration with community groups to be essential for successful social prescribing [43]. This was found to be mediated by both informal relationships and formal connections, such as through a link worker. Access to referral resources was also found to be a barrier for HCPs advising patients about community physical activity groups [44]. Linked to this, Carstairs et al. [44] found that HCPs often lacked time to seek out up-to-date referral information.

#### 4.3. Motivation to recommend yoga

HCPs' motivation was a significant predictor of the likelihood to recommend yoga. Alignment with the motivation statements was high, especially relating to the importance of holistic treatment and the belief that yoga could support patients' unmet needs. HCPs' positive sentiment towards yoga is supported by findings in the US that yoga was one of the most used complementary and integrative health practices among rehabilitation professionals [39]. More broadly, Aughterson et al. [43] found that GPs in the UK were motivated to engage with social prescribing as a more holistic and community-centred approach to care. Other research has suggested that HCPs assume some responsibility as part of their social and professional role in motivating patients to engage in lifestyle improvements, such as physical activity [44]. Conversely, Sharp et al. [48] found the more holistic model of health and healthcare espoused by CAM to be a barrier to its integration into NHS primary care. This suggests that HCPs may be more supportive of recommendations and referrals to address patients' needs holistically than integration into primary care.

Most participants indicated they had had a positive experience with yoga and/or positive feedback from patients. While sentiment toward yoga was mainly positive in this survey, a minority of HCPs had had negative experiences with yoga and the qualitative findings indicated some concern about yoga stereotypes. This aligns with findings by Southby and Gamsu [65] indicating that negative perceptions and beliefs about voluntary and community sector organisations among GPs were a barrier to collaboration. Further exploration into potential negative perceptions of yoga among HCPs is warranted. Most of the participants in this study were not concerned with risks relating to the referral of yoga. This contrasts with Carstairs et al. [44] findings indicating that medico-legal concerns were a noteworthy barrier among some HCPs for recommending community-based physical activity groups. It may be that HCPs typically view yoga as a gentle, adaptive form of exercise as suggested by previous research [49]. This aligns with participants' predominant association with yoga as a mind-body therapy.

#### 4.4. Strengths and limitations

To the authors' knowledge, no previous study has focused on understanding perceptions of yoga among HCPs and this research has addressed a gap in the literature, providing foundational insights. The research was informed by the COM-B theoretical framework, which is considered 'best practice' in navigating the complexity of behaviour and developing behaviour interventions [40]. Convenience sampling resulted in a sample that was not representative and notably skewed towards being more positive about and engaged with yoga. Obtaining survey responses from HCPs is a known challenge [51]. McRobert et al. [51] found that using a multi-modal strategy, including the use of social media, for the recruitment of clinicians to online surveys is an acceptable approach but does have weaknesses, including an indeterminate degree of self-selection bias. While the authors could not find any studies

to indicate the prevalence of regular yoga practice among HCPs in the UK, Wen et al. [39]'s research among HCPs in the US reported that 41.2% practice yoga for self-care and Sulenes et al. [4]'s research among US healthcare students indicated 29.1% were yoga practitioners. The prevalence of yoga practice within this sample (68.8% practising monthly) was therefore higher than expected. Replication of this research among a more representative sample of HCPs is warranted to further understand negative perceptions towards yoga.

The COM-B scale was a new measure, designed specifically for this study. While internal reliability was good for the overall COM-B scale and acceptable for the capability subscale, it was only satisfactory for the opportunity and motivation subscales. The COM-B subscales were created based on factor analysis and theory. The factor loadings did not align with the author's interpretation of the theory in all cases (see supplementary materials B). The factor analysis also indicated five factors suggesting more nuanced subscales may be appropriate. Thus, there is an opportunity to refine the subscales in terms of the scale items and groupings to improve reliability and validity. Future studies may use a dependent variable that reflects actual behaviour more closely.

#### 4.5. Conclusion

While HCPs surveyed in this study were highly engaged with yoga, they perceived yoga to be beneficial to health, aligning with practitioners' perceptions of yoga as a health-supportive practice [2]. The HCPs surveyed were found to be motivated to recommend yoga to patients, especially for skeletal and psychological issues. Increased age, capacity, and motivation predicted a greater likelihood to recommend yoga. Being a GP predicted a lower likelihood to recommend yoga, potentially due to encountering more barriers. Barriers to recommending yoga were mostly related to the opportunity to do so and to a lesser extent their capability. While most HCPs claimed to be knowledgeable about yoga for health, there is an opportunity to support HCPs with information about where patients can access appropriate and affordable instruction. Raising awareness and increasing understanding of yoga therapy, which may be most appropriate for patients, is also warranted. Increasing knowledge of specialised yoga programs for specific conditions and patient groups would facilitate referral, especially if these programs were endorsed by the NHS and/or relevant professional bodies. While busyness was not perceived as a barrier to engaging with yoga as a possible intervention for patients, further exploration into HCPs' decision-making processes and consultation time constraints is warranted, especially among GPs. Funding to make yoga more affordable to patients and raising awareness of the supporting evidence may encourage the recommendation of yoga by HCPs. Replication of this study among a more representative sample is required to provide further insight into HCPs who are less familiar with yoga.

#### Author contributions

CS had the idea for this research. CS and TC developed the methodology and designed the questionnaire together. Both authors assisted in recruitment. CS conducted the analysis with input and supervision from TC. CS wrote the initial draft of the paper with input and editing from TS. Both authors revised and agreed on the final version of the paper.

#### Funding sources

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### Declaration of competing interest

The authors declare no conflict of interest.

## Acknowledgements

We would like to thank and acknowledge the Minded Institute, the Yoga in Healthcare Alliance, and the Research Council for Complementary Medicine for their support in recruitment. We would like to thank and acknowledge Heather Mason, Dr Kim Stacey, and Simon Brittz for their support with the questionnaire design.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ctcp.2023.101765>.

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