Accepted Manuscript

British Journal of General Practice

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Walsh, Nicola; Halls, Serena; Thomas, Rachel; Berry, Alice; Liddiard, Cathy; Cupples, Margaret; Gage, Heather; Jackson, Dan; Cramp, Fiona; Stott, Hannah; Kersten, Paula; Jagosh, Justin; Foster, Dave; Williams, Peter

DOI: https://doi.org/10.3399/BJGP.2023.0560

To access the most recent version of this article, please click the DOI URL in the line above.

Received 25 October 2023
Revised 05 January 2024
Accepted 22 January 2024

TITLE

First Contact Physiotherapy: An evaluation of clinical effectiveness and costs

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Funding: This study was funded by the NIHR Health and Social Care Delivery Research Programme (16/116/03). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

ABSTRACT

Background: First Contact Physiotherapy Practitioners (FCPPs) are embedded within general practice, providing expert assessment, diagnosis and management plans for patients with musculoskeletal disorders (MSKDs), without the prior need for GP consultation.

Aim: To determine the clinical effectiveness and costs of FCPP-led compared to GP-led models of care.

Design and Setting: Multiple site case study design. UK GP practices.

Method: General Practice sites were recruited representing three models: 1. GP-led care; 2. FCPPs who could not prescribe/inject (Standard (St)); 3. FCPPs who could prescribe/inject (Additional Qualifications (AQ)). Patient participants from each site completed clinical outcome data at baseline, 3 and 6 months. The primary outcome was the SF-36v.2 Physical Component Score (PCS). Healthcare usage was collected for 6 months.

Results: N=426 adults were recruited from 46 practices across the UK. Non-inferiority analysis showed no significant difference in physical function (SF36-PCS) across all three arms at 6 months (p=0.999). At 3 months a significant difference in numbers improving was seen between arms: 54.7% GP consultees; 72.4% FCPP-St, 66.4% FCPP-AQ; (p=0.037). No safety issues were identified. Following initial consultation, a greater proportion of patients received medication (including opioids) in the GP-led arm (44.7%) compared with FCPP-St (17.5%) and FCPP-AQ (22.8%); (p<0.001). NHS costs (initial consultation and over 6 months follow up) were significantly higher in the GP-led model (median £105.50) vs FCPP-St (£41) and FCPP-AQ (£44); (p<0.001).

Conclusion: FCPP led models provide safe, clinically effective and cost-beneficial management for patients with MSKDs in general practice and reduced opioid use in this cohort.

Keywords: general practice; physiotherapy; musculoskeletal; outcomes; costs

How this fits in (<4 sentences)

Introducing FCPPs into general practice provides access to expert MSKD skills and helps manage patient demand for appointments; MSKD consultations account for up to a third of GP workload. This study found that FCPPs provide a safe, clinically effective and cost-beneficial alternative to GP-led consultations. FCPPs also positively impact on medication use (including opioids) and patients improve quicker having consulted with FCPPs. Embedding FCPP as a standard model in general practice will provide significant cost-benefits to the patient and healthcare system whilst reducing the number of patients consulting GPs with MSKDs.

INTRODUCTION

General practice is experiencing unprecedented demand for appointments at a time when the number of fully qualified general practitioners (GPs) is falling, part-time working is increasing and average patient caseload is rising (1). The Additional Roles Reimbursement Scheme (2019) was introduced with the intention of growing the capacity of the primary care workforce (2). First Contact Physiotherapy Practitioners (FCPPs) were one of five professional roles initially identified for expedited implementation (2) in recognition of the growing demands Musculoskeletal Disorders (MSKDs) place on general practice; accounting for up to 30% of consultations (3). FCPPs have an extended appointment time (normally 20 minutes) to assess, diagnose and determine the most appropriate interventions and manage onward referral for patients without the prior need for GP consultation (4). Some FCPPs also have the capability to provide injection therapy, and following legislation change in 2013, licensed physiotherapists can independently prescribe, including, since 2015, some controlled drugs (5). By 2024 all adults in England consulting with a suspected MSKD should be offered a consultation with a FCPP within their local practice (6).

Since its inception, local service evaluations indicate that FCPP reduces the need for GP consultation, referral to secondary care services and prescribed medications, whilst improving patient and staff satisfaction (7). The only large-scale evaluation of FCPP was conducted as part of an NHS England national pilot of the initiative and reported against pre-determined criteria including: re-consultation rates with the GP; improvements in patient symptoms at three months; provision of self-management/exercise advice for the condition; and impact on ability to work (8). Pre-determined criteria were largely successfully met, apart from limited information on presenteeism and the ability to work. Whilst this evaluation provided important data on the potential of FCPP, there was no insight regarding longer-term clinical outcomes, use of healthcare resources, or differences in outcomes compared to traditional GP-led models of care.

The current study aimed to determine the impact of FCPP on clinical outcomes and healthcare resource use for six months post-consultation compared to GP-led models of care.

METHOD

Setting and Practice Recruitment

General practices across the UK were invited to participate either via expressions of interest in response to a previous survey regarding FCPP provision (9), or through advertisement via Clinical Research Networks. We aimed to recruit across all four nations, from a range of urban and rural areas, and differing levels of deprivation; deprivation index was based on practice report and confirmed by nationally available data (10-13).

Description of Services

General practice study sites were categorised into three study arms according to their existing service provision:

1. No FCPP service: MSKD management with GP-led consultation ('GP')
2. Standard FCPP with no additional competencies for prescribing and/or injecting ('FCPP-St')

3. FCPP with additional qualifications to prescribe and/or inject ('FCPP-AQ')

Participant Recruitment

Patients who attended appointments for MSKDs in the study sites were given recruitment materials by the clinician or allocated practice staff member and invited to contact the study team for further information or to express their willingness to participate, and for eligibility screening.

Inclusion criteria:	(i) Patients consulting with a suspected MSKD episode, defined as any acute or chronic disorder related to the spinal or peripheral musculoskeletal system; (ii) Not consulted for the same problem in preceding 3 months; (iii) ≥18.
Exclusion criteria:	(i) Receiving palliative care; (ii) Non-English speaking and unwilling to provide informed consent and communicate through an interpreter.

Eligible participants provided written, informed consent. Recruitment commenced in December 2019, slowed in January 2020 due to the emerging COVID-19 pandemic, and paused in March 2020. Recruitment re-commenced under COVID-19 restrictions in July 2020 and ended in April 2022. Final assessments were completed in October 2022.

Data Collection

Information on age, gender, reason for consultation, MSK risk (using STarT MSK), education and employment was collected by telephone at baseline (post consultation). Participants were also asked about their consultation experience and any safety concerns (to be reported elsewhere): with no notable differences across groups.

Questionnaires regarding Patient Reported Outcome Measures (PROMs) were posted to participants following initial consultation (baseline) and at three- and six- months post-consultation, were self-completed and returned by post. The primary outcome measure was the change from baseline to 6-months in the SF-36v.2 Physical Component Score (PCS) (14). Secondary clinical outcomes were SF-36v.2 Mental Component Score; Musculoskeletal Health Questionnaire (MSK-HQ, Total and Physical); perceived safety of health care, using the health care experience in general practice survey, short form (PREOS-PC Q5), on a 10 point scale – completely unsafe (0) to completely safe (10); and Roland Morris Disability Questionnaire (for patients with low back pain). EQ-5D-5L, a generic measure of health-related quality of life was gathered for use in the economic evaluation (15).

Sample size

Based on a non-inferiority margin of 2 units in SF-36v2-PCS scale (14); a minimal clinically important difference of 4 points (16); and SD 6.5 (17), a one-sided p=0.05 non-inferior hypothesis test, with 80% power, a design effect of 1.09 for a cluster size of 14 and an ICC of 0.0075 (18), and 20% attrition, the total participants required per arm was n=181 across n=39 sites. COVID-19 impacted recruitment, so figures were revisited: using actual attrition rates (5%) and increased number of sites (n=46) required a total sample size of n=462 (n=154 per arm).

Data Analyses

Primary Outcome: The change in SF-36v2-PCS from baseline to 6 months was compared between arms using a 1-way analysis of variance; in case of difference, a post-hoc unpaired t-test was performed. Further comparisons were undertaken in the context of stepwise linear regression modelling, incorporating demographic and clinical data, including baseline SF-36v2-PCS. Outcomes from baseline to three months are also reported.

Economic Analysis

The base case economic analysis adopted an NHS and social care perspective. Information on resource use related to the MSK condition was gathered retrospectively by telephone interview at 3 months and 6 months using a tailored version of the Client Service Receipt Inventory (CSRI) (19). This included: NHS and private healthcare services (primary, community, A&E, outpatient referrals, in-patient stays) and social care. Unit costs (20-21) were applied to service use and summed (months 1 – 6) at the participant level, including the cost of the index consultation (See Supplementary Materials 1). Group costs were inspected and compared. Due to the skewed nature of the total costs data, stepwise logistic regression was used to model the presence or absence of additional costs over and above the cost of the initial presentation with service model as a dummy variable and baseline demographic and clinical factors as covariates. A societal perspective was included through consideration of self-reported days off work and inability to perform usual activities; and the private perspective through out-of-pocket expenditures.

Analyses were carried out using SPSS version 27 (IBM Corporation). Database access can be requested via http://researchdata.uwe.ac.uk/703.

Ethical approval: Granted on 18/6/2019 (IRAS ID: 261530; REC reference number: 19/NI/0108). HRA approval granted on 25/6/2019.

RESULTS

A total of n=426 participants were recruited from 46 general practices across the UK, with a range of deprivation indices and rural/urban locations. A total of 426 participants were recruited to the study. There were 110 (25.8%) from service model GP, 124 (29.1%) from service FCP-St, and 192 (45.1%) from service model FCP-AQ. A total of 46 GP practices were involved: 13 GP (with 1,2,2,5,6,6,7,10,11,14,14,15 and 17 participants), 15 FCP(ST) (with

1,3,3,3,4,4,5,7,7,9,9,14,15,17 and 23 participants) and 18 FCP(AQ) (with 1,1,4,4,6,8,8,9,11,12,14,15, 15,16,16,16,17 and 19 participants).

Mean age was 63 years (SD 13.2); 34.1% were male and 97.8% reported white ethnicity. There were no statistically significant differences in individual baseline demographics between arms (*Table 1*). There was some discrepancy in practice level deprivation across arms, with a higher representation of low deprived practices in the FCP(St) arm (*Table 1*). Data were returned at all three time points by 377 (88.5%) participants, including 320 (75.1%) who provided completed PROM and CSRI data. Details of attrition from the study are given in Supplementary materials 2.

Clinical data revealed no statistically significant differences between arms at baseline, except for the EQ-5D-5L (VAS) (better state of health reported in FCP-St model) and for MSK-HQ total (a more desirable musculoskeletal status was indicated in FCP-St model); Participants reported a range of peripheral and spinal diagnoses (up to two pain sites); given the previously reported high incidence of low back pain in primary care (18), we noted a 24.8% (106/426) prevalence. (*Table 2*).

Outcomes analysis

The Primary Outcome variable was the change in SF-36v2-PCS from Baseline to 6 months; in an unadjusted analysis, no statistically significant difference was found between arms *(Table 3)*. This was confirmed under linear regression, with a final model (R^2=0.138, n=332) predicting change = 15.074 – 0.333* (SF-36v2-PCS at Baseline) + 2.377 (if university educated) +2.402 (if in full-time employment); service model along with age at Baseline, gender (male: Yes/No), ethnic origin (white: Yes/No), whether MSKD area at Baseline included Back (Yes/No), whether MSKD area at Baseline included Knee or Leg or Hip or Foot or Ankle (Yes/No) and whether the presented MSK condition had affected employment or ability to perform usual activities (Yes/No) were not significant.

However, when each of these change outcomes was simplified from the change in continuous score to an Improved or Worsened/Stayed the same scenario, a statistically significant difference between arms was seen in two instances. At 3 months, the FCPP-St and FCPP-AQ service models delivered a statistically significant greater improvement rate for the Primary outcome variable SF-36v.2-PCS compared to the GP service model (p=0.037). And at 6 months, the FCPP-St and FCPP-AQ service models delivered a statistically significant greater improvement rate for the Secondary outcome MSK-HQ Physical compared to the GP service model (p=0.016) (*Table 3*). No other statistically significant differences in outcomes were found between arms. No safety issues were identified.

Healthcare Utilisation and costs

The initial consultation was assumed to be face-to-face with a GP, FCPP-St or FCPP-AQ. CSRI data were available for 370/426 (86.9%) of participants at 3 months, 348 (81.7%) at 6 months (Supplementary materials 2). Health service use after the initial consultation was low in all arms, most being within general practice; few participants

reported hospital use. Key health service usage (GP and physiotherapist) and prescribing outcomes are shown in *Table 4.* In the 3 months following initial consultation, a greater proportion of patients received medication (including opioids) in the GP-led arm (44.7%) compared with FCPP-St (17.5%) and FCP-AQ (22.8%) (Chi-square: p<0.001). A full breakdown of NHS service use, including medication prescribing, at 3 and 6 months is shown in Supplementary materials 3 and 5. There was scattered use of the private sector whilst use of over-the-counter medications was commonplace (Supplementary materials 4 and 6). No safety issues were identified.

Group mean total costs (health services, excluding medications) over 6 months' follow-up for the three service models are shown in *Table 5.* Comparisons were performed both excluding and including inpatient (planned MSK surgery) events, and assuming the FCPP-St and FCPP-AQ were both working at salary level Band 7; a sensitivity analysis was performed with the FCPP-AQ costed at the higher Band 8a. In each comparison, there is a statistically significant difference between the three models (p<0.001) with the GP model the more costly (median £105.50 per patient versus £41.00 for FCPP-St and £44.00 for FCPP-AQ in the Band 7 calculation, and no statistically significant difference between the FCPP-St and FCPP-AQ. In the Band 8a comparison, the FCPP-AQ was significantly more costly than the FCPP-St. Regarding days lost through inability to work or perform usual activities, the FCPP-St model showed greater reductions in days lost compared to GP and FCPP-AQ, but there was no statistically significant difference between GPs and FCPP-AQ (*Table 6*). Only 8 participants had absences covered by sick notes in the first 3 months and 3 during the second period (2 of which were new).

Backwards stepwise logistic regression to model the presence or absence of additional health service costs in months 0-6 over and above the initial presentation (excluding inpatient), with re-running of the final model to include additional participants for whom data were missing only for non-significant predictors, led to the model in *Supplementary materials 7* (with Nagelkerke R^2 = 0.089 and n=334). The model demonstrates a significantly (2.181 times) higher likelihood of incurring additional cost with a GP service model compared to a FCPP-St or FCPP-AQ service model. Higher scores in baseline SF-36 PCS are also significantly associated with a lower likelihood of incurring additional cost (adjusted odds ratio of 0.966 implies that a participant with a baseline SF-36 PCS which is 10 points higher than another participant is 0.966^{10} = 0.708 times less likely to incur additional cost). No other predictors were statistically significant.

Cost-effectiveness: In summary, the analysis demonstrated that neither FCPP model was inferior in relation to clinical outcome at six months post-consultation compared to the GP led model, but both were significantly less costly. There were no significant differences in quality of life changes (based on EQ-5D-5L), between the models at 3 or 6 months, so given the cost differentials, no formal cost-effectiveness analysis was undertaken (*Table 3 and Table 5)*.

DISCUSSION

Summary

Analysis demonstrated no statistically significant difference in clinical outcomes between different service models after 6 months. However, the GP led model of care was approximately two and a half times costlier than the FCPP-St and FCPP-AQ models. Furthermore, at 3 months a greater proportion of patients who consulted with FCPPs had improved, compared to the GP, and time off work or unable to perform usual activities was reduced in the FCPP-St consultees.

Strengths and limitations

This is the first study to compare GP and FCPP led models of care for MSKDs and include data from all four UK nations. It provides a robust overview of the service innovation to support decision making and a qualitative analysis, which was conducted concurrently, will allow further interpretation of findings.

Recruitment was severely hampered by the COVID-19 pandemic, yet this study still provides the most extensive dataset of FCPP to date. There was uneven recruitment across study arms and sites because the drive for FCPP recruitment resulting from the Additional Roles Reimbursement Scheme made the identification of GP-led sites challenging; and recruitment within some individual sites was lower than anticipated. At site level, there was some variation in deprivation across arms: the FCP-St consisted of relatively more practices with lower levels of deprivation compared to the other arms, which may explain the higher levels of quality of life (EQ5D-5L (VAS) and MSK-HQ) reported at baseline within this arm. However, whilst these differences were of statistical significance neither was of clinical significance, based on previously reported levels of minimum clinical important difference (22-23) and, importantly, there was no difference in the primary outcome measure at baseline across arms. We recruited all sites that expressed an interest in participation, so this variation did not result from selective recruitment. Furthermore, at the level of individual participants we found no significant differences between groups regarding levels of education or employment.

The sample was almost exclusively white and not representative of practice cohorts despite efforts for diverse recruitment at practice and patient level. Only 12/46 (26%) sites returned requested data regarding numbers invited to participate in the study, so we are unable to report how representative the study sample is of those eligible. Much of the recruitment was undertaken under COVID restrictions which disproportionately impacted people of non-white heritage which may have influenced decision to participate, although in consultation with recruitment sites, we identified that fewer people from non-white communities consult FCPP staff. There was potential recruitment bias as not all eligible participants consented to join the study.

Comparison with existing literature

To our knowledge, this is the first study to show a comparison between GP and FCPP clinical outcomes and resource use, confirming the proposed benefits of the new model of care. Whilst at 6 months there were no

differences in patient improvement across the models studied, at 3 months a significantly greater proportion of patients who consulted with FCPPs had improved compared to GP consultees, with positive impact on ability to work or perform usual activities in FCP-St. Previous work highlighted GP propensity for pharmacological management rather than guideline based self-management and rehabilitation strategies which may account for these differences (24-26); indeed, a greater proportion of patients under GP-led care were prescribed medication, including opioid derivatives. We are unable to identify any factors in the study design that would account for this finding, and believe this is a result of clinical decision-making. Other work has shown that FCPPs with a license to prescribe are still reluctant to use this intervention, instead choosing to use their capability to deprescribe where possible and intervene with non-pharmacological measures (27).

From an onward resource use perspective, data showed minimal reliance on other services within each model and therefore relatively low costs. For services that were used there was a greater number of referrals onto outpatient physiotherapy by GPs, as would be expected; other work has suggested GP overuse of MRI, but this was not found (28). These data were obtained through self-report so may have been subject to recall bias. We note however that other studies report the similarities in self-report versus medical record review, and in some cases note greater accuracy with patient recall (29).

A previous evaluation in England reported that GP workload was positively impacted by FCPP: most patients did not consult their GP with the same problem within three months of seeing the FCPP (8). This concurs with our findings that only 23/276 (8.3%) of patients consulted the GP for the same problem having seen the FCPP, whereas many more (30.9%) initial GP consultees re-consulted the GP for the same problem within the study period *(Table 4)*.

A predominant aim of introducing FCPPs is to make better use of resources in general practice. Our study shows clear cost benefits to implementing FCPP models compared to GP-led care given the extent of MSKD consultations in primary care (3).

Implications

This research supports continued implementation of FCPP in general practice as a safe, clinically effective and cost-beneficial approach for managing people with MSKDs. Given FCPPs' low reliance on medications, it may also assist in reducing opioid prescriptions in primary care. Further research is required to understand why there appears to be disproportionate consultations from people of non-white heritage to ensure appropriate access for all.

Funding: This study was funded by the NIHR Health and Social Care Delivery Research Programme (16/116/03). The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

Ethical approval: Granted on 18/6/2019 (IRAS ID: 261530; REC reference number: 19/NI/0108). HRA approval granted on 25/6/2019.

Competing interests: The authors have no conflicts to declare

Acknowledgements: The FRONTIER team would like to thank all participants for their time and valuable contribution to the study. We would also like to thank Gemma Artz, Pete Young, Jude Hancock, Alison Diaper, the Study Steering Committee and the research team at Bristol, North Somerset and South Gloucestershire Integrated Care Board for their expertise and support.

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Author contribution

NW conceived the study; all authors contributed to the design, DF provided the patient perspective. NW, SH, RT, AB, CL, MC collected the data PW designed and performed the statistical analysis; HG designed and performed the economic analysis assisted by DJ. NW led the manuscript preparation assisted by HG and PW; all authors reviewed and commented.

Table 1: Baseline demographics: summary statistics with comparison of the three service models

Demographic Feature	Total [426 participants]			GP [110 participants]			FCPP-St [124 participants]			FCPP-AQ [192 participants]			Comparison Test
	N	Mean Min-Max	Standard Deviation	N	Mean Min-Max	Standard Deviation	N	Mean Min-Max	Standard Deviation	N	Mean Min-Max	Standard Deviation	ANOVA:
Age (years)	425^	63.0 21.1-94.1	13.2	109^	63.2 21.5-89.9	13.3	124	63.1 21.1-83.6	12.8	192	62.8 13.4 - 94.1	13.4	p = 0.962
	N	n	Percentage	N	n	Percentage	N	n	Percentage	N	n	Percentage	Chi-Squared:
Gender: Male	425	145	34.1%	110	37	33.6%	123	41	33.3%	192	67	34.9%	p = 0.953
Ethnic Group: White	417	408	97.8%	107	106	99.1%	122	116	95.1%	188	186	98.9%	n/a*
Education:	410			108			119			183			Kruskal-Wallis:
Primary/Secondary		101	24.6%		26	24.1%		29	24.4%		46	25.1%	p = 0.512
Further Education		179	43.7%		51	47.2%		57	47.9%		71	38.8%	
Associate degree		12	2.9%		4	3.7%		4	3.4%		4	2.2%	
Bachelor's Degree		70	17.1%		18	16.7%		16	13.4%		36	19.7%	
Master's Degree		24	5.9%		6	5.6%		6	5.0%		12	6.6%	
Professional Degree		20	4.9%		3	2.8%		5	4.2%		12	6.6%	
Doctorate		4	1.0%		0	0.0%		2	1.7%		2	1.1%	
Employment status:	418			108			121			189			Chi-squared:
Employed full-time		109	26.1%		26	24.1%		31	25.6%		52	27.5%	p=0.749
Employed part-time		68	16.3%		19	17.6%		24	19.8%		25	13.2%	
Voluntary worker/ Unemployed & seeking work/ Homemaker/ Carer		40	9.6%		9	8.3%		13	10.7%		18	9.5%	
Retired		201	48.1%		54	50.0%		53	43.8%		94	49.7%	
Site Deprivation Index†	N=46	n	Percentage	N=13	n	Percentage	N=15	n	Percentage	N_18	n	Percentage	Kruskal-Wallis
High		13	28.3%		3	23.1%		4	26.7%		6	33.3%	p=0.500
Medium		16	34.8%		6	46.1%		3	20.0%		7	38.9%	
Low		17	36.9%		4	30.8%		8	53.3%		5	27.8%	

^ One participant did not provide their age

* An expected cell count of <5 for 3 out of 6 cells, caused by scarcity of ethnic groups other than white - only 9 amongst 426 participants (2.1%) – precluded a valid comparison test

† Based on highest, middle and lowest thirds

Table 2: Baseline clinical summary for each of the three service models

Clinical Feature	ALL [426 participants]				GP [110 participants]				FCPP-St [124 participants]				FCPP-AQ [192 participants]				Comparison Test
	N	n	Percentage		N	n	Percentage		N	n	Percentage		N	n	Percentage		Chi-Square:
MSKD area included BACK	426	106	24.9%		110	20	18.2%		124	33	26.6%		192	53	27.6%		p = 0.165
	N	Mean	Standard Deviation	Min - Max	N	Mean	Standard Deviation	Min - Max	N	Mean	Standard Deviation	Min - Max	N	Mean	Standard Deviation	Min - Max	ANOVA:
SF-36: PCS	403	35.6	10.5	10.2 – 62.3	103	35.3	9.3	15.7 – 55.7	118	36.8	10.2	12.6 – 57.0	182	35.0	11.3	10.2 – 62.3	p = 0.338
SF-36: MCS	403	49.1	10.9	13.7 – 69.4	103	47.0	12.4	13.7 – 64.7	118	50.5	10.1	21.0 – 69.3	182	49.4	10.4	20.4 – 69.4	p = 0.051
EQ-5D-5L Score (England)†	423	0.709	0.230	-0.281 – 1.000	109	0.683	0.262	-0.281 – 1.00	123	0.749	0.183	0.210 – 1.00	191	0.698	0.235	-0.241 – 1.00	p = 0.062
EQ-5D-5L VAS	422	68.8	19.3	0 - 100	109	66.7	20.0	15 - 95	122	72.6	17.3	10 - 100	191	67.6	19.9	0 - 100	p = 0.036*
MSK-HQ Total	414	33.8	10.4	5 - 54	106	32.1	10.2	8 - 53	123	35.5	9.2	9 - 54	185	33.5	11.1	5 - 54	p = 0.044*
MSK-HQ Physical activity	421	2.7	2.4	0 - 7	109	2.39	2.31	0 - 7	123	3.01	2.46	0 - 7	189	2.71	2.42	0 - 7	p = 0.145
Roland-Morris ^	98	9.4	6.1	0 - 24	18	11.2	5.8	1 - 20	32	8.2	5.9	1 - 21	48	9.5	6.4	0 - 24	p = 0.253
STarT MSK pain intensity [0 to 10 (worst)]	401	6.3	2.3	0 - 10	105	6.4	2.3	1 -10	117	6.1	2.2	0 - 10	179	6.4	2.3	0 - 10	p = 0.441

†Devlin et al. (2018) (30). ^ Only reported in relation to participants with a diagnosis involving back pain *difference between groups of statistical significance but not of clinical significance; identifying hierarchy FCPP-St) > (GP, FCPP-AQ)

Table 3: Primary and secondary outcome changes from baseline to 3 months and from baseline to 6 months (positive changes indicate improvement)

	Time point	TOTAL [426 participants]					GP [110 participants]					FCP-St [124 participants]					FCP-AQ [192 participants]					Change: Comparison Test	Improved: Comparison Test
Primary outcome	**months**	**N**	**Improved n (%)**	**Change Mean**	**Change SD**	**Change Range**	**N**	**Improved n (%)**	**Change Mean**	**Change SD**	**Change Range**	**N**	**Improved n (%)**	**Change Mean**	**Change SD**	**Change Range**	**N**	**Improved n (%)**	**Change Mean**	**Change SD**	**Change Range**	**ANOVA:**	**Chi-squared**
SF-36: PCS	3	336	219 (65.2%)	2.72	8.42	-32.27 to 36.28	86	47 (54.7%)	1.87	8.18	-17.82 to 27.73	98	71 (72.4%)	3.69	8.05	-15.19 to 23.70	152	101 (66.4%)	2.58	8.78	-32.27 to 36.28	p=0.332	p=0.037*
	6	348	234 (67.2%)	4.15	9.78	-38.86 to 35.54	89	57 (64.0%)	4.12	9.70	-28.67 to 29.06	107	75 (70.1%)	4.18	8.98	-20.90 to 27.00	152	102 (67.1%)	4.15	10.42	-38.36 to 35.54	p=0.999	p=0.667
Secondary outcome																							
SF-36: MCS	3	336	160 (47.6%)	-0.14	8.25	-24.14 to 27.52	86	46 (53.5%)	0.68	8.50	-23.07 to 26.30	98	43 (43.9%)	-0.23	8.07	-24.14 to 27.52	152	71 (46.7%)	-0.54	8.23	-23.84 to 17.52	p=0.542	p=0.409
	6	348	170 (48.9%)	-0.43	8.78	-32.12 to 32.59	89	46 (51.7%)	0.66	10.31	-32.12 to 32.59	107	50 (46.7%)	-1.05	7.93	-24.15 to 16.66	152	74 (48.7%)	-0.64	8.37	-28.94 to 23.54	p=0.370	p=0.786
EQ-5D-5L Score (England)†	3	362	185 (51.1%)	0.0347	0.1662	-0.656 to 0.897	96	44 (45.8%)	0.0370	0.1712	-0.400 to 0.897	102	56 (54.9%)	0.0350	0.1549	-0.350 to 0.519	164	85 (51.8%)	0.0331	0.1710	-0.656 to 0.732	p=0.984	p=0.429
	6	376	229 (60.9%)	0.0483	0.1639	-0.525 to 0.897	95	56 (58.9%)	0.0480	0.1793	-0.508 to 0.897	113	70 (61.9%)	0.0370	0.1463	-0.525 to 0.519	168	103 (61.3%)	0.0561	0.1665	-0.398 to 0.790	p=0.630	p=0.898
EQ-5D-5L VAS	3	361	170 (47.1%)	0.96	14.01	-55 to 70	96	42 (43.8%)	0.58	16.75	-55 to 70	99	48 (48.5%)	1.49	11.99	-35 to 45	166	80 (48.2%)	0.85	13.46	-50 to 40	p=0.895	p=0.745
	6	371	169 (45.6%)	0.50	16.94	-67 to 76	94	40 (42.6%)	0.82	19.19	-55 to 76	111	46 (41.4%)	-1.05	15.70	-67 to 55	166	83 (50.0%)	1.36	16.42	-65 to 55	p=0.501	p=0.298
PREOS-PC Q5 [0 to 10 (best)]	3	337	87 (25.8%)	-0.09	1.74	-9 to 6	90	21 (23.3%)	-0.06	1.59	-6 to 4	91	24 (26.4%)	-0.26	2.17	-9 to 6	156	42 (26.9%)	-0.01	1.52	-7 to 5	p=0.535	p=0.817
	6	348	84 (24.1%)	-0.22	1.89	-8 to 5	90	22 (24.4%)	-0.14	1.52	-5 to 4	101	32 (31.7%)	-0.18	2.22	-8 to 5	157	30 (19.1%)	-0.29	1.97	-7 to 5	p=0.825	p=0.070
MSK-HQ Total	3	356	232 (65.2%)	3.29	8.05	-25 to 32	93	58 (62.4%)	2.66	7.89	-24 to 32	102	67 (65.7%)	3.61	7.98	-14 to 30	161	107 (66.5%)	3.47	8.22	-25 to 26	p=0.667	p=0.798
	6	367	256 (69.8%)	4.78	8.67	-23 to 34	92	68 (73.9%)	5.22	8.29	-23 to 34	113	74 (65.5%)	4.78	8.86	-18 to 32	162	114 (70.4%)	4.52	8.80	-21 to 26	p=0.830	p=0.415
MSK-HQ Physical	3	362	118 (32.6%)	0.03	2.13	-7 to 7	96	25 (26.0%)	-0.10	2.11	-7 to 7	102	34 (33.3%)	-0.07	2.05	-7 to 5	164	59 (36.0%)	0.17	2.20	-7 to 7	p=0.520	p=0.252
	6	371	125 (33.7%)	0.13	2.19	-7 to 7	94	21 (22.3%)	-0.09	1.99	-5 to 7	112	46 (41.1%)	0.29	2.03	-5 to 7	165	58 (35.2%)	0.15	2.40	-7 to 7	p=0.462	p=0.016*
Roland-Morris ^	3	72	38 (52.8%)	-1.36	3.42	-10 to 6	11	5 (45.5%)	-1.09	3.18	-7 to 3	23	11 (47.8%)	-1.17	3.96	-10 to 6	38	22 (57.9%)	-1.55	3.20	-7 to 4	p=0.882	p=0.650
	6	73	44 (60.3%)	-1.95	3.72	-10 to 8	13	10 (76.9%)	-2.62	2.72	-9 to 1	25	12 (48.0%)	-1.20	4.31	-10 to 8	35	22 (62.9%)	-2.23	3.59	-10 to 4	p=0.449	p=0.204

†Devlin et al. (2018) (30). ^Only reported in relation to participants with BACK diagnosis *Identifying hierarchy (FCPP-St, FCPP-AQ) > GP

Table 4. Key self-reported NHS service usages associated with the presenting MSK condition, not including initial presentation, at 3 & 6 months

NHS service	3 months: Total (N=370)			6 months: Total (N=348)			3 months: GP (N=94)			6 months: GP (N=90)			3 months: FCP-St (N=114)			6 months: FCPP-St (N=107)			3 months: FCPP-AQ (N=162)			6 months: FCPP-AQ (N=151)		
	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)	Users: n	Percent	Contacts (average)
General Practice																								
GP	52	14.1%	74 (0.20)	30	8.6%	39 (0.11)	29	30.9%	47 (0.50)	14	15.6%	21 (0.23)	10	8.8%	11 (0.10)	8	7.5%	9 (0.08)	13	8.0%	16 (0.10)	8	5.3%	9 (0.06)
Physiotherapist	90	24.3%	135 (0.36)	38	10.9%	69 (0.20)	9	9.6%	18 (0.19)	5	5.6%	14 (0.16)	27	23.7%	43 (0.38)	11	10.3%	26 (0.24)	54	33.5%	74 (0.46)	22	14.6%	29 (0.19)
Outpatient Referrals ^																								
Physiotherapy	38	10.3%	80 (0.22)	26	7.5%	60 (0.17)	16	17.2%	42 (0.45)	8	9.0%	17 (0.19)	11	9.6%	20 (0.18)	8	7.5%	19 (0.18)	11	6.8%	18 (0.11)	10	6.6%	24 (0.16)
Prescribed medications	Users: n	Percent		Users: n	Percent		Users: n	Percent		Users: n	Percent		Users: n	Percent		Users: n	Percent		Users: n	Percent		Users: n	Percent	
ANY	102	27.6%		66	19.0%		42	44.7%*		27	30.0%**		20	17.5%		16	15.0%		37	22.8%		23	15.2%	
Analgesics	15	4.1%		13	3.7%		7	7.4%		7	7.8%		2	1.8%		2	1.9%		6	3.7%		4	2.6%	
NSAIDs	43	11.6%		23	6.6%		16	17.0%		8	8.9%		7	6.1%		7	6.5%		20	12.3%		8	5.3%	
Opioids	53	14.3%		36	10.3%		27	28.7%***		15	16.7%****		6	5.3%		7	6.5%		20	12.3%		14	9.3%	

^ Outpatient Referrals data missing for 1 GP participant

* GP statistically significant (p<0.001) higher prevalence when compared to FCPP-St, or to FCPP-AQ , or to FCPP-St and FCPP-AQ combined at same time point

**GP statistically significant higher prevalence when compared to FCPP-St(p=0.011) , or to FCPP-AQ(p=0.006), or to FCPP-St and FCPP-AQ combined(p=0.002) at same time point

*** GP statistically significant higher prevalence when compared to FCPP-St(p<0.001) , or to FCPP-AQ(p=0.001), or to FCPP-St and FCPP-AQ combined(p<0.001) at same time point

**** GP statistically significant higher prevalence when compared to FCPP-St(p=0.025) , or to FCPP-St and FCPP-AQ combined(p=0.022), but not to FCPP-AQ(p=0.088) at same time point

Table 5: Total costs (£) summary statistics, months 0 – 6

Cost (£)	Total [425 participants]				GP [109 participants]				FCPP-St [124 participants]				FCPP-AQ [192 participants]				Comparison Test
	N	Mean	Median	Min - Max	N	Mean	Median	Min - Max	N	Mean	Median	Min - Max	N	Mean	Median	Min - Max	Kruskal-Wallis
Total excluding inpatient (FCP-AQ Band 7)	348	142.77	52.00	22-1964	90	235.56	105.50	39-1738	107	112.95	41.00	22-952	151	108.59	44.00	22-1964	P<0.001
Total including inpatient (FCP-AQ Band 7)	348	382.47	52.00	22-16784	90	507.44	105.50	39-16334	107	260.92	41.00	22-16784	151	394.11	44.00	22-15922	P<0.001
Total excluding inpatient, assuming Band 8a (not Band 7) for FCP-AQ	348	144.97	52.00	22-1967	90	235.56	105.50	39-1738	107	112.95	41.00	22-952	151	113.66	50.00	25-1967	P<0.001
Total including inpatient, assuming Band 8a (not Band 7) for FCP-AQ	348	384.66	52.00	22-16784	90	507.44	105.50	39-16334	107	260.92	41.00	22-16784	151	399.16	50.00	25-15925	P<0.001

Initial consultation costs were: GP £39; FCP-St £22; FCPP-AQ Band 7 £22; FCPP-AQ Band 8a £44.
All unit costs are given in Supplementary Materials 1
The costs of medications and private treatment were excluded, as were the cost of wellness and exercise classes, and additional expenses such as home help, personal care, home adaptations, mobility equipment and transport for treatment costs as these were extremely rare and reporting was patchy, so considered potentially unreliable.

Table 6: Changes in days lost (unable to work or perform usual activities), with comparisons of the three service models

	Time point	TOTAL [426 participants]				GP [110 participants]				FCPP-St [124 participants]				FCPP-AQ [192 participants]				Comparison Test
Employment/ Usual activities	**months**	**N**	**n**	**%**	**Mean, Median (IQR)**	**N**	**n**	**%**	**Mean, Median (IQR)**	**N**	**N**	**%**	**Mean, Median (IQR)**	**N**	**n**	**%**	**Mean, Median (IQR)**	**Kruskal-Wallis:**
Change in days lost compared to pre-baseline	3	284			-5.0, 0 (-2 to 0)	74			5.7, 0 (0 to 0)	81			-16.5, 0 (-10.5 to 0)	129			-3.9, 0 (-2 to 0)	p=0.019
More			37	13.0			14	18.9			5	6.2			18	14.0		p=0.049
Same			173	60.9			46	62.2			51	63.0			76	58.9		
Fewer			74	26.1			14	18.9			25	30.9			35	27.1		
Change in days lost compared to months 0-3	6	264			-8.7, 0 (-7 to 0)	68			-3.9, 0 (-7 to 0)	77			-20.5, 0 (-75 to 0)	119			-3.8, 0 (-3 to 0)	p=0.063
More			26	9.8			7	10.3			5	6.5			14	11.8		p=0.200
Same			154	58.3			42	61.8			42	54.5			70	58.8		
Fewer			84	31.8			19	27.9			30	39.0			35	29.4		

Note: a negative number indicates fewer days lost

Mann Whitney U test, pairwise comparisons of changes:

3 months: GP vs FCPP-St p=0.005; GP vs FCPP-AQ p=0.127; FCPP-St vs FCPP-AQ p=0.093

6 months: GP vs FCPP-St p=0.055; GP vs FCPP-AQ p=0.978; FCPP-St vs FCPP-AQ p=0.031