Personalised Care Interventions: Rapid Evidence Review (diabetes, MSK & COPD)

Review details

Commissioned by the **Evidence team** within the NHSE Personalised Care Group

Undertaken by **Transformation Partners in Health & Care***

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How to use this document

This document is designed to give you a swift and meaningful **insight** into the findings of the review of evidence for Personalised Care in diabetes, MSK and COPD.

There are brief **summaries** of why and how the review was undertaken, and how we arrived at the set of papers we reviewed in depth.

The **evidence** for each condition area is set out as bullet points. These are hyperlinked to an evidence summary in the appendices, where you can see more detail about that finding.

Each of the papers in the evidence summary is further hyperlinked so you can go directly to the original **source material**.

Introduction

Personalised Care is a key policy for the NHS, and part of the LTP

Aim: to embed personalised, person-centred care into all local health systems

Evidence for the effectiveness of PC has been sporadic, and piecemeal

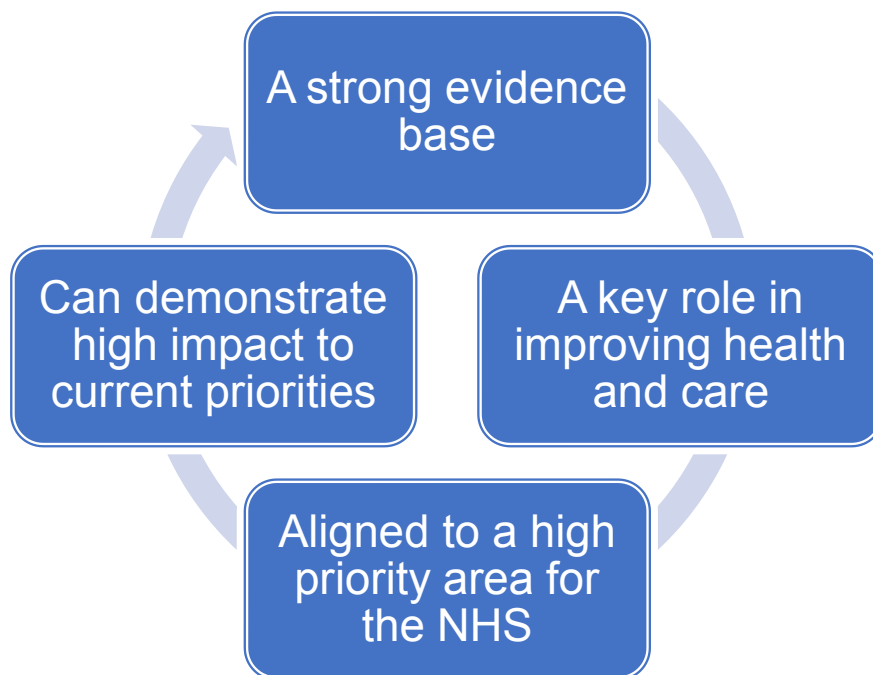Current need for a review of the evidence, to support planning and policy-making

Commission from the Evidence Task & Finish Group to undertake such a review for fast delivery

Transformation Partnership in Health & Care (Royal Free London NHS FT) undertook this commission

The Brief

The Evidence Task and Finish Group drafted a briefing document, which can be summed up in the bullets below:

1) *Establish 3 key high impact areas where felt personalised care has:*

A strong evidence base

A key role in improving health and care

Aligned to a high priority area for the NHS

Can demonstrate high impact to current priorities

2) *Conduct and produce literature review of the evidence in these key areas.*

3) *Develop resource/products for each high impact area that can be used to influence decision making where personalised care makes its greatest impact.*

These areas are to be Diabetes, MSK and acute respiratory disease (COPD).

Methodology

A full Systematic Review was beyond budget and timescale, so Rapid Evidence Assessment selected as methodology, with broadly qualitative approach using narrative synthesis

Papers under review were limited to Systematic Reviews and Meta-analyses to limit numbers

The PICO tool was deployed, and produced this Research Question: 'In those with MSK, diabetes or respiratory disease (P), what has been the effect of "Personalised Care" [as defined by the universal model of personalised care] (I) on health utilisation, clinical outcomes, wellbeing outcomes, patient experience & safety (O)?'

Search strings developed with input from SMEs, using wildcards and Boolean operators

On academic advice, we limited our search to Embase, Medline and the Cochrane Library

Screening

Screening is the process of funnelling the very large quantity of papers found during the initial trawl of the databases into a number that can realistically be reviewed in the requisite depth.

Review quality

AMSTAR2 (A Measurement Tool to Assess Systematic Reviews) was deployed to assess the quality of the reviews shortlisted

Among other factors, it assesses

Condition area	Critically low	Low	Moderate	High	Adjusted score
Diabetes	0	4	7	8	3.21
MSK	2	0	3	4	3
COPD	0	0	0	5	4

All scores are acceptable, COPD the best of the three conditions

Headlines

The positive impact of PC interventions can be seen in 5 areas

Patient expertise in managing their condition.
This includes understanding of their condition, greater efficacy in management, and empowerment

Clinical.
Measured using standard clinical outcomes. Evidence varies in strength.

General health, both physical and mental.
The review of NICE Guidelines strongly supported this theme.

System.
Clear evidence that PC interventions reduce hospital admissions, at least for COPD and diabetes.

Quality of life/ wellbeing.
Factors beyond health that improve the patient's quality of life

The next section looks at the specific findings for the three condition areas

Diabetes

Telehealth (ie web-based programmes, interactive digital interventions, wearables)

- can **reduce hospital admissions** by 4.1% and **decrease BP** by 3.74 mmHg (systolic) and 2.37 mmHg (diastolic), approximately 3% and 3.4% respectively
- mobile phone-based intervention showed **significant improvement** in HbA1c levels
- wearable insoles **reduced diabetic foot ulcer** occurrence by 86%

Education-based (ie cognitive reframing, behaviour change)

- patient education showed **a statistically significant reduction** in fasting blood glucose, and HbA1c
- patient empowerment **reduced glycated haemoglobin** and **increased diabetes empowerment and knowledge** scores

Decision/ peer support (ie trained peer education, social media-based interventions)

- **pooled mean difference** of 0.57% for HbA1c
- interactive digital interventions show **reduced SBP** and **better self-efficacy**
- patient education programmes produced a **reduction in HbA1c**

MSK

Decision-support tools
- **improved knowledge** (statistical significance high)
- **better understanding of personalised risk** (statistical significance high)
- **less decisional conflict and more empowerment from clinicians**

Telehealth
- **reduced school absenteeism** by 29%
- **reduction of pain intensity** by 17.3%
- fitbit **increased walking** by 183.1 min/week

self-management education boosters with physical and psychological therapies
- **better pain management and less catastrophising**, mean difference = 20.42, (95% Confidence Interval)
- mean VAS (visual analogue score) for pain **showed a reduction** of 0.8 points

Digital-based SSM
- showed a **pain reduction** of 5.7%
- **better than health education** by 0.17 Standard Deviations

COPD

health coaching
- **reduction in hospital admissions** (statistical significance high)

Blended SSM (electronic & f2f)
- **less frequent exacerbation** (Relative Risk = 0.38)
- **reduction in BMI** (mean difference = 0.81)
- **improved QoL** (mean difference = 0.81)

Nutritional support
- **increases in protein intake** (statistical significance high)

Other SSM including education
- smoking cessation, exercise, exacerbation action plan etc
- 2.86 **lower score on St. George's Respiratory Questionnaire**
- **lower risk of A&E attendance**, Hazard Ratio = -0.52
- **mean difference of 45.14m** in walking test
- **improved QoL** scores

Discussion

Here we explore the findings against the identified areas from the original brief

Conclusions and recommendations

In some forms for some conditions, the evidence supports the assertion that **PC leads to lower healthcare utilisation**. The evidence is strongest for SSM in COPD.

There is cross-condition support for the positive impact that PC has on patient health, wellbeing and clinical outcomes

Deep dive analyses would be instructive to identify areas of variation and relationships of PC interventions to deprivation and other wider determinants of health

More research is required to understand more about the **other components** of PC and their impact, as well as more exploration of how the **indirect impacts** might reduce utilisation in the longer term

More evidence is required to explore **the person-centric impact** of PC, not just one of the components or its interventions in isolation of the others

More information is needed about the impact of PC interventions on **utilisation in primary care**

An evidence review could look **at co-morbid patients**, and the impact that PC interventions have for them

Exploration may be constructive around the impact on **staff**

It is clear that this is a **complex, multi-dimensional** area, where multiple interventions may be in place for a patient with multi morbidities

Appendices

Diabetes evidence summary

Paper ID	Intervention	Authors and URL	Primary outcome	Numerical impact
11	Patient education	Ha Dinh et al	One study reported increase in medical adherence compared to usual care (Negarandeh, 2011)	+ 20% adherence (adherence to dietary: 3.63 vs 5.87 and 6.15 out of maximum 9 score) and medication regimens (4.32 vs 6.73 and 7.03 out of maximum 8)
			Two studies reported significant increase in knowledge scores in diabetes following the intervention (Swavely 2013, Negarandeh, 2011)	Diabetes knowledge test: 84% score in IG vs 40.7 % in CG. (Swavely 2013) Mean end point knowledge score (29.41 in control vs 35.32 in intervention (Negarandeh, 2011)
17	Peer support	Qi et al	Reduction of Hba1c	Pooled MD of -0.57% [95% CI: −0.78 to −0.36]
30	Patient education (Culturally Tailored Diabetes Educational Intervention)	Nam et al	Improved Glycaemic control	Pooled ES of glycaemic control in RCTs with CTDEI was -0.29 (95% confidence interval, -0.46 to -0.13)
57	Telehealth	Hanlon et al, 2017	A meta-analysis of mobile phone interventions found they increased glycaemic control (Liang, 2013)	Reduced HbA$_{1c}$ values by a mean of 0.5% over a median of 6 months follow-up duration [6mmol/mol; 95% confidence interval, 0.3–0.7% (4–8 mmol/mol)]
66	Telehealth (web-based interventions)	Hadjiconstantinou et al, 2016	Five studies with outcome data for depression showed reduced feelings of depression (58, 53, 60, 59, 50)	The pooled mean difference between the IG and CG's depression score was -0.31 (95% confidence interval)
			Six studies that reported on distress found it was reduced	The pooled mean difference between intervention and control on distress scores was -0.11 (-0.38 to 0.16
84	Telehealth		+ adherence = + cost-effectiveness	1% adherence = $5.42
			+ adherence = + cost-effectiveness	1Hg decrease = $7.39
			MA reported a significant reduction in blood pressure compared to UC.	-3.74 mmHg (sbp), -2.37 mmHg (dbp)
84	Telehealth (interactive digital interventions -IDIs)	McLean et al, 2016	Overall, IDIs significantly reduced SBP	WMD -3.74mmHg [95% confidence interval (CI) -2.19 to -2.58] with no heterogeneity observed (I-squared¼0.0%, P¼0.990).
			For DBP, four out of six studies indicated a greater reduction for intervention compared to controls, with no difference found for two.	WMD of -2.37mmHg (95% CI -0.40 to -4.35) was found, but considerable heterogeneity was noted (I-squared¼80.1%, P¼<0.001).
			Increased self-efficacy	Correlated with Positive Outcome Expectations (r = 0.30, P = 0.037) and Diabetes Self-Management and Diabetes Quality of Life for Youths (r = 0.43, P = 0.002)

Click a hyperlink to go to the paper

189	Telehealth (mobile phone)	Wu et al, 2018	RCTs compared Smartphone Technologies with usual diabetes care among T2DM patients and reported a significant reduction in HbA1c	Pooled weighted mean difference: -0.51%; 95% confidence interval: -0.71% to -0.30%; p < 0.001), favouring ST intervention. The pooled weighted mean difference was -0.83% in patients with T2DM <8.5 years and -0.22% in patients with T2DM ≥8.5 years, with significant subgroup difference (p = 0.007).
209	Telehealth (nurse-led)	Wong et al, 2022	Reduction in number of hospital admissions	-4.1% (telehealth group had 152 out of 640 (23.8%), usual face-to-face group of participants there was 218 out of 780 (27.9%).
			The intervention groups of community-dwelling older adults significantly improved in overall QoL.	SMD 0.12; (95% CI 0.03 to 0.20; P=0.006; I2=21%)
			The intervention groups of community-dwelling older adults significantly improved in overall self-efficacy	SMD 0.19; (95% CI 0.08 to 0.30; P<.001; I2=0%)
			The intervention groups of community-dwelling older adults significantly improved in overall depression levels.	SMD –0.22; (95% CI –0.36 to –0.08; P=.003; I2=89%)
214	Telehealth (wearable insole)	Mattison et al, 2022	Reduced diabetic foot ulcer occurrence (Abbot, 2019)	86% reduction at 18month follow-up
214	Telehealth (digital medicine offering)		DMO resulted in a statistically greater SBP reduction than usual care (Frais, 2017)	Mean –21.8, SE 1.5 mm Hg vs mean –12.7, SE 2.8 mmHg; mean difference –9.1, 95% CI –14.0 to –3.3 mm Hg) and maintained a greater reduction at week 12
217	Patient empowerment	Mogueo et al, 2020	Reduction in hospital admissions (1 study relating to Pharmacist-led medication therapy, Erku, 2017)	-52.1% in number of admissions
			Seven studies (24,26,35,38,39,41,42)with meta-analysable data on blood pressure showed statistically significant differences between control in favour of interventions.	The pooled results for SBP MD was −5.13 [95% CI: −9.42, −0.84] (P = .02)
			Seven studies (24,26,35,38,39,41,42)with meta-analysable data on blood pressure showed statistically significant differences between control in favour of interventions.	The pooled results for DBP indicated that there is a statistically significant difference in the outcomes of mean difference (MD) −4.28 [95% CI: −7.18, −1.37] (P = .004)
			Four studies were included in a meta-analysis (24,26,41,42). The pooled results indicate that there is a small, statistically significant difference in the outcomes between intervention and control groups in terms of hba1c.	Overall effect size of −0.59 (95% CI: −0.72, −0.47] (P < .00001)
227	Telehealth (nurse-led)	Lee et al, 2022	Pooled intervention effects from 2 studies showed a significant improvement in the systolic blood pressure of patients through Telerehabilitation.	MD 10.48; (95% CI, MD 1.52; 95% CI)
			The pooled SMD indicates significant positive effect on enhancing the self-care behavior	SMD 1.20;

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			of patients with diabetes when compared with conventional face-to-face nursing consultations	(95% CI 0.55-0.84; P<.001; heterogeneity: X2 4=46.3; I2=91%; P<.0)
352	Patient education	Ricci-Cabelo et al, 2014	Thirty-one studies assessed the impact of the interventions on fasting blood glucose (27,29-33,37-44,46-60,62,63)	71% of studies observed that the educational programs produced statistically significant improvements in FBG
			Thirty-one studies assessed the impact of the interventions on hba1c (27,29-33,37-44,46-60,62,63)	59% of studies observed that the educational programs produced statistically significant improvements in hba1c
			Thirty-one studies assessed the impact of the interventions on fasting blood glucose (27,29-33,37-44,46-60,62,63)	57% of studies observed that the educational programs produced statistically significant improvements in fasting blood sugar
			Meta-analysis of 20 randomized controlled trials (3,094 patients) indicated that the programs produced a reduction in hba1c	SMD −0.31% (95% CI −0.48% to −0.14%).
391	Patient empowerment	Chen et al, 2021	Compared to routine care, empowerment-based intervention is associated with reduced glycated haemoglobin levels	SMD -0.20; (95% CI -0.31 to -0.08; Z=3.40, P<.001, I2=42%)
			Compared to routine care, empowerment-based intervention was associated with increased diabetes empowerment scores	SMD 0.24; (95% CI 0.10–0.37; Z=3.42, P<.001, I2=0%)
			Compared to routine care, empowerment-based intervention was associated with increased diabetes knowledge scores	SMD 0.96; (95% CI 0.55–1.36; Z=4.61, P<.001, I2=80%)
			The meta-analysis showed that compared to routine care, empowerment based intervention was associated with reduced glycated hemoglobin levels	SMD -0.20 (95% CI -0.31 to -0.08; Z=3.40, P<.001, I2=42%)
			Five studies [8,12,13,16,18] measured the psychosocial self-efficacy by the scores of Diabetes Empowerment Scales (DES). Patient empowerment improved significantly in the intervention group as compared with the control	SMD 0.24; (95% CI 0.10–0.37; Z= 3.42, P<.001)
			Four studies[7,12,14,18] provided the scores of diabetes knowledge after Intervention. The score of diabetes knowledge was significantly higher in the intervention group than the control	SMD 0.96 (95% CI 0.55–1.36; Z=4.61, P<.0)
448	Telehealth (computer based)	Kingshuk et al, 2013	In a meta-analysis of 11 trials, computer-based interventions have shown benefits for glycaemic control	Pooled effect on HbA1c: -2.3 mmol/mol or -0.2% (95% confidence interval (CI) -0.4 to -0.1; P = 0.009; 2637 participants; 11 trials).
			Improved disease knowledge (Lo, 1996)	10.9 to 14.3 on diabetes knowledge scale
			Increases patient empowerment (Lorig, 2010)	+0.021(PAM Score)

			Improved patient knowledge (Quinn, 2008)	Knowledge of food choices compared with the control group (91% versus 50%)
			Improves self-efficacy (Quinn, 2008)	Diabetes self-care questionnaire (100% versus 75%).
	Telehealth (mobile phone)		Meta-analysis of three mobile phone-based interventions found a statistically and clinically significant reduction in HbA1c (Liang, 2011)	MD in HbA1c -5.5 mmol/mol or -0.5% (95% CI -0.7 to -0.3); P < 0.00001; 280 participants; three trials).

MSK evidence summary

Paper ID	Intervention	Authors and URL	Outcome	Numerical impact
54	Decision support	Coylewright et al, 2014	Participants receiving care with the DAs had greater gains in general knowledge compared with UC, with no evidence of a treatment interaction with any of the sociodemographic characteristics analysed.	62% vs 45%; P<0.0001
			Patients who used the DAs were found to know their personalized risk (knowledge of risk) more often than those receiving UC	50% vs 20%; P<0.0001
			Decisional conflict was lower for patients in the DA arm as compared with UC across all sociodemographic groups. There were no significant treatment interactions between sociodemographics.	13 (intervention) vs 18 (control) points
			Clinicians encouraged patient empowerment significantly more often when using decision support.	39 (Intervention) vs 21 (Control)
158	Telehealth		Reduction in school absenteeism (Armbrust et al., 2017)	43% to 14%
158	Telehealth (iCanCope)	Butler et al, 2022	Reduction in pain intensity (Lalloo et al., 2020)	1.73-point reduction on 1-10 scale
160	Telehealth (FitBit)	Mattison et al, 2022	Walking time (Amorim et al., 2019)	Increase of 183.1 min/week
164	Self-management education (booster sessions)	Buzasi et al, 2022	significant reduction in pain catastrophizing in patients with CMP after a self-management intervention	SMD 20.42 (95% CI)
212	Telehealth	Safari et al, 2020	Reduction in pain	5.7% reduction
			Digital-based structured SMPs vs health education condition	Favours digital SMPs (SMD 0.26; 95% CI)
			Reduction in pain	5.7% reduction
			Increase in physical function	5.07% improvement
			Improved quality of life	0.17 SDs higher
349	Self-management education	Kroon et al, 2014	Reduction in pain	SMD between groups was -0.26 (95% CI -0.44 to -0.09); mean reduction of 0.8 points on VAS Scale

COPD evidence summary

Paper ID	Intervention	Authors and URL	Outcome	Numerical impact
11	Health coaching	Long et al, 2019	Significant beneficial impact on quality of life	SMD = −0.69, 95% CI: −1.28, −0.09, *p* = .02, from *k* = 4
			significant reduction in COPD-related hospital admissions	(OR = 0.46, 95% CI: 0.31, 0.69, *p* = .0001, from *k* = 5)
9	Blended self-management	Song et al, 2021	Reduction in exacerbation frequency	Relative Risk =0.38; 95% CI 0.26-0.56
			Significant reduction in BMI	d=0.81; 95% CI 0.25-1.34
			Large effect was found on QoL	SMD=0.81; 95% CI
89	Nutritional support	Collins et al, 2012	Significantly greater increases in mean total protein and energy intakes	(1.94 ± 0.26 kg, P < 0.001
126	Self-management interventions	Schrijver et al, 2022	HRQoL Assessed with: St. George's Respiratory Questionnaire adjusted total score. Scale from: 0 to 100 Note: lower scores indicate better HRQoL	2.86 points lower (4.87 lower vs 0.85 lower)
			Lower risk of emergency department visits	-0.52 (95% CI)
			Reduced SGRQ score, indicating better quality of life	-2.86 (95% CI)
			Improvement in exercise capability	MD of 45.14 meters in walking (95% CI 9.16 to 81.13; Analysis 2.13).
	Self-management interventions (action plans)		Statistically significantly lower risk for at least one respiratory-related hospital admission	OR 0.69, 95% CI 0.51 to 0.94
	Self-management education		Activity levels significantly improved: Six studies, with 772 participants, measured exercise capacity using the six-minute walking test (6MWT) and could be included in the meta-analysis	Pooled MD of 45.14 meters reached the MCID of 25 meters and therefore is considered clinically relevant (Holland 2010).
127	self-management interventions including exacerbation action plans with a smoking cessation programme	Leferink et al, 2017	contributed to significant improvements in HRQoL (Lenferink 2017).	MD from usual care of -2.69 points (95% CI -4.49 to -0.90; 1,582 participants; 10 studies; high-quality evidence).