

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\***

Report prepared by

**Rhys Ellis**

**Dr Alex Mears**

With academic support from

**Dr Hayley McBain** (SW AHSN)

**James Hayward** (NHSE DAIS team)

And clinical SME support from

**Karla Sypsa** (diabetes)

**Afroza Shamsudin** (MSK)

**Kara Renno** (COPD)

\*part of the Royal Free London NHS Foundation Trust

# How to use this document

# Introduction

# 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:
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

# 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

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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

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

Click a hyperlink to go to the paper in the evidence review

# Diabetes

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

* can [**reduce hospital admissions**](#Paper209)by 4.1% and [**decrease BP**](#Paper84)by 3.74 mmHg (systolic) and 2.37 mmHg (diastolic), approximately 3% and 3.4% respectively
* mobile phone-based intervention showed [**significant improvement**](#Paper189)in HbA1c levels
* wearable insoles [**reduced diabetic foot ulcer**](#Paper214)occurrence by 86%

## Education-based (ie cognitive reframing, behaviour change)

* patient education showed **a** [**statistically significant reduction**](#Paper352)in fasting blood glucose, and HbA1c
* patient empowerment [**reduced glycated haemoglobin**](#Paper391)and [**increased diabetes empowerment and knowledge**](#Paper391)scores

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

* [**pooled mean difference**](#Paper17)of 0.57% for HbA1c
* interactive digital interventions show [**reduced SBP**](#Paper84)and [**better self-efficacy**](#Paper84)
* patient education programmes produced a [**reduction in HbA1c**](#Paper352)

# MSK

## Decision-support tools

* [**improved knowledge**](#Paper54) (statistical significance high)
* [**better understanding of personalised risk**](#Paper54) (statistical significance high)
* [**less decisional conflict and more empowerment from clinicians**](#Paper54)

## Telehealth

* [**reduced school absenteeism**](#Paper158) by 29%
* [**reduction of pain intensity**](#Paper158) by 17.3%
* fitbit [**increased walking**](#Paper160) by 183.1 min/week

## self-management education boosters with physical and psychological therapies

* [**better pain management and less catastrophising**](#M164), mean difference = 20.42, (95% Confidence Interval)
* mean VAS (visual analogue score) for pain [**showed a reduction**](#M349) of 0.8 points

## Digital-based SSM

* showed a [**pain reduction**](#M212) of 5.7%
* [**better than health education**](#M212) by 0.17 Standard Deviations

# COPD

## health coaching

* [**reduction in hospital admissions**](#C11) (statistical significance high)

## Blended SSM (electronic & f2f)

* + [**less frequent exacerbation**](#C9) (Relative Risk = 0.38)
  + [**reduction in BMI**](#C9) (mean difference = 0.81)
  + [**improved QoL**](#C9) (mean difference = 0.81)

## Nutritional support

* + [**increases in protein intake**](#C89) (statistical significance high)

## Other SSM including education

* + smoking cessation, exercise, exacerbation action plan etc
  + 2.86 [**lower score on St. George’s Respiratory Questionnaire**](#C126)
  + [**lower risk of A&E attendance**](#C126), Hazard Ratio = -0.52
  + [**mean difference of 45.14m**](#C126) in walking test
  + [**improved QoL**](#C127) scores

# Discussion

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

# Conclusions and recommendations

# Appendices

## Diabetes evidence summary

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Paper ID | Intervention | Authors and URL | Primary outcome | Numerical impact |
| 11 | Patient education  Click a hyperlink to go to the paper | [Ha Dinh et al](http://dx.doi.org/10.11124/jbisrir-2016-2296) | 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](http://dx.doi.org/10.1186/s12889-015-1798-y) | 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](http://dx.doi.org/10.1097/JCN.0b013e31822375a5) | 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](http://dx.doi.org/10.2196/jmir.6688) | A meta-analysis of mobile phone interventions found they increased glycaemic control (Liang, 2013) | Reduced HbA1c 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](http://dx.doi.org/10.2196/jmir.5991) | 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 | [McLean et al, 2016](http://dx.doi.org/10.1097/HJH.0000000000000859) | + 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) | 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) |
| 189 | Telehealth (mobile phone) | [Wu et al, 2018](http://dx.doi.org/10.1111/obr.12669) | 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](http://dx.doi.org/10.2196/31912) | 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](http://dx.doi.org/10.2196/36690) | 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](http://dx.doi.org/10.1002/edm2.174) | 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](http://dx.doi.org/10.2196/40364) | 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  of patients with diabetes when compared with conventional  face-to-face nursing consultations | SMD 1.20;  (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](http://dx.doi.org/10.1186/1472-6823-14-60) | 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](http://dx.doi.org/10.1097/MD.0000000000027353) | 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](https://doi.org/10.1002/14651858.CD008776.pub2) | 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](http://dx.doi.org/10.1161/HCQ.0000000000000006) | 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 | [Butler et al, 2022](http://dx.doi.org/10.2196/30457) | Reduction in school absenteeism (Armbrust et al., 2017) | 43% to 14% |
| 158 | Telehealth (iCanCope) | Reduction in pain intensity (Lalloo et al., 2020) | 1.73-point reduction on 1-10 scale |
| 160 | Telehealth (FitBit) | [Mattison et al, 2022](http://dx.doi.org/10.2196/36690) | Walking time (Amorim et al., 2019) | Increase of 183.1 min/week |
| 164 | Self-management education (booster sessions) | [Buzasi et al, 2022](http://dx.doi.org/10.1097/j.pain.0000000000002302) | 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](http://dx.doi.org/10.2196/15365) | 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](https://doi.org/10.1002/14651858.CD008963.pub2) | 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](http://dx.doi.org/10.1111/bjhp.12366) | 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](http://dx.doi.org/10.2196/24602) | 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](http://dx.doi.org/10.3945/ajcn.111.023499) | 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](https://doi.org/10.1002/14651858.CD002990.pub4) | 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 signficantly 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](https://doi.org/10.1002/14651858.CD011682.pub2) | 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). |