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Reporting dose in complex self-management support interventions for long-term conditions: is it defined by researchers and received by participants? - a systematic review

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Abstract:

Background: The minimum clinically effective dose and whether this is received in randomised controlled trials (RCTs) of complex self-management interventions in Long-Term Conditions (LTCs) can be unclear. The Template for Intervention Description and Replication (TIDieR) checklist states that dose should be clearly reported to ensure validity and reliable implementation.

Objectives:

To identify whether the expected minimum clinically effective dose is stated and the dose participants received reported within articles.

To determine whether reporting has improved since the TIDieR checklist was published.

Methods: Four databases were systematically searched (MEDLINE, PsycINFO, AMED and CINAHL) to identify published reports between 2008 and 2020 for RCTs investing complex self-management interventions in LTCs. Data on reporting of dose was extracted and synthesised from the eligible articles.

Results: 82 articles covering various LTCs including diabetes, stroke and arthritis were included. Most complex interventions involved behaviour change combined with education and/or exercise. The maximum dose was usually reported (97.6%), but the expected minimum clinically effective dose and the dose received were reported in only 23.2% and 62.2% of articles, respectively. Reporting of the expected minimum clinically effective dose and the dose participants received did not improve following the publication of the TIDieR checklist in 2014.

Conclusions: Poor reporting of dose within complex self-management interventions for LTCs makes the results difficult to interpret and implement. If trial findings indicate benefit from the intervention, clear reporting of dose ensures reliable implementation to standard care. If the results are non-significant, detailed reporting enables better interpretation of results i.e. differentiating between poor implementation and lack of effectiveness. This ensures quality of interventions and validity and generalisability of trial findings. Therefore, wider adoption of reporting the TIDieR checklist dose aspects is strongly recommended. Alternatively, customised guidelines for reporting dose in complex self-management interventions could be developed.

Registration: Prospero ID CRD42020180988

Keywords: dose; reporting; complex self-management intervention; long-term condition; systematic review; TIDieR checklist; fidelity

Strengths and limitations of this study:

- This is the first systematic review of its kind to look at whether dose is being reported as the guidelines recommend in self-management interventions.
- Double screening and data extraction were completed, ensuring all eligible papers were included and accurate data extracted. This process was also piloted and any issues resolved before being applied to all eligible papers.
- Determining eligibility based on the definition of complex self-management was challenging, but we developed a systematic approach to limit any potential bias.

- Quality assessment of eligible papers was not conducted, but it could have been interesting to see if quality of study correlated with quality of reporting.

Background:

It is estimated that 30% of the UK population live with a Long-Term Condition (LTC) and that LTCs account for 70% of health and social care spending within the NHS (1). This prevalence extends globally, with a growing awareness of the importance of monitoring prevalence and developing interventions to overcome LTCs, due to the aging population, predicted increase in LTCs and the associated costs (2, 3). Therefore, the management of LTCs is a priority for the NHS. LTCs are defined as "diseases of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors" (4). The current evidence base suggests LTC treatment should focus on supporting effective self-management to result in better health outcomes (5). Self-management here is defined in conjunction with the US Institute of Medicine definition, echoed by the Department of Health; "Self-management is defined as the tasks that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their conditions." (6, 7).

Complex self-management interventions are known to improve a variety of health outcomes in LTCs, including self-efficacy (confidence in ability to execute specific behaviours), patient activation (confidence, skills and knowledge to manage their own health care), self-rated health, clinical outcomes and social outcomes (8). Complex self-management interventions contain several interacting components that

aim to change patients' behaviour. However, determining which parts of the complex intervention are necessary to result in a potential benefit can be difficult. Therefore, complex self-management interventions should go through stages of development before being evaluated, typically in randomised control trials (RCTs), to identify how much of which components result in the best outcomes (9). Once decided upon, at least the expected minimum clinically effective dose of the complex self-management intervention should be compared to standard care for the LTC to see if health outcomes improve. However, in published reports of RCTs it is often unclear how the minimum clinically effective dose of the intervention was determined or, indeed, what the researchers believe the expected minimally clinically effective dose to be.

The concept of dose refers to the number of intended units of each intervention (dose delivered) and the extent of engagement of participants with the intervention (dose received) (10). Treatment fidelity refers to the extent to which the intervention is delivered as expected, how much of the intervention is received and the amount of treatment enactment of the intervention by participants. Focussing on fidelity of treatment receipt, if the number and length of sessions received is in line with that stated in the protocol, it is essential researchers determine what they think the minimum clinically effective dose is and measure if it is received by participants within the trial, so fidelity of treatment receipt can be assessed (11, 12). Collecting and reporting this information ensures the quality and integrity of the intervention and enables assessment of how valid and generalisable the findings are (10). Additionally, not stating the expected minimum clinically effective dose and if it has been delivered and received makes it difficult to interpret RCT results. If trial results

are non-significant and fidelity of treatment receipt is not reported, it is unclear if this result is due to a lack of effectiveness or failed implementation of the intervention. Ensuring non-significant effects are due to lack of intervention effectiveness helps to avoid a type ii error, whereby the treatment is deemed not effective when the findings are due to confounding variables, such as poor implementation (13).

To improve the reporting of all types of interventions the Template for Intervention Description and Replication (TIDieR) checklist (14) was developed in 2014. The 12 items explain how interventions should be described in published articles, so that trials with effective interventions can be replicated validly and implemented into standard practice reliably. The intervention details required for non-pharmacological interventions, such as the behavioural and educational components used in complex self-management interventions, are explained. Focusing on dose, Item 8 of the checklist highlights 'when and how much', whereby RCT articles should clearly state the number of sessions in the intervention, their duration and over what time period they are delivered. Also, Items 11 and 12 of the checklist state that the planned, delivered and received doses should be included to ensure both adherence and fidelity can be assessed (outlined in Table 1). No previous, published reviews within the LTC complex self-management literature have reviewed whether dose and fidelity are being reported in this way.

Table 1. Extract from the TIDieR checklist of the relevant item descriptions for this review.

TIDieR Checklist Item	Description
Item 8	When and how much: Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose
Item 11	How well (planned): If intervention adherence or fidelity was assessed, describe how and by whom, and if any

	strategies were used to maintain or improve fidelity, describe them
Item 12	How well (actual): If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned

This systematic review aimed to identify how complex self-management intervention doses for patients with LTCs are reported in RCTs. We assessed this by evaluating whether what the researchers believe to be the minimum clinically effective dose was stated, how this dose was determined, if the dose received by study participants was stated and how it compared to the expected minimum clinically effective dose (fidelity of treatment receipt). We also aimed to determine if reporting of expected minimum clinically effective dose and treatment dose received improved following the publication of the TIDieR checklist in 2014. Finally, we aimed to identify whether reporting of expected minimum clinically effective dose and treatment dose received differed depending on whether the primary outcome results were statistically significant or not. We hypothesised that reporting of dose would have improved since the publication of the TIDieR checklist and that studies with non-significant primary outcomes may report dose more clearly than studies with a significant outcome in an attempt to explain their results.

Methodology:

Search strategy for systematic review and inclusion and exclusion criteria

The systematic review was conducted in accordance with PRISMA (Supplementary Table 1). MEDLINE, CINAHL, AMED and PsychInfo were systematically searched. The full search strategies can be found in Supplementary Figure 1. Publications were included if published between January 2008 and June 2020, to identify if there

was a trend towards improved reporting of treatment dose from 6 years before to 6 years after the TIDieR checklist was published (2014).

Inclusion criteria (PICOS)

- Population: populations with long-term conditions (4)
- Intervention: complex self-management support with structured sessions (containing several interacting components that aim to change patients' behaviour), delivered to patients (6, 7)
- Comparator: any
- Outcome: any
- Study Design: randomised controlled trials

Exclusion criteria

- Does not include human participants
- Not a complex self-management support intervention with structured sessions e.g. exercise or psychotherapy only interventions
- Interventions delivered to carers, health care professionals etc.
- Only published as an abstract
- Ongoing studies

The articles from the database searches were exported into EndNote, duplicates removed and brief screening completed (e.g. removing systematic reviews). Those remaining were uploaded into Abstrackr (http://abstrackr.cebm.brown.edu/) and the two reviewers (TR and AB) independently screened titles and abstracts against the inclusion criteria, classifying articles as included, excluded and maybe eligible.

Identified discrepancies were discussed with ST to reach a final decision for full text data extraction.

Data extraction and analysis

Data was independently extracted by TR and AB onto a Word based proforma designed for the study and any disagreements discussed until consensus was reached.

For all studies we extracted trial authors, country, year of publication, intervention name, intervention description and components, LTC disease area, maximum intervention dose that could be delivered in the context of their study, expected minimum clinically effective dose, any rationale given for this, actual dose received, fidelity of treatment receipt and intervention delivery, and statistical significance of the primary outcome.

Within the articles, reporting of dose was determined by the number and length of sessions available to participants and how many they attended. Minimum expected clinically effective dose was either explicitly stated or stated as the number of sessions needed to be attended to be considered a 'completer' or to be included in the per protocol analysis. If no detail was provided, then this was recorded as 'not reported'. An example of the data extraction process can be seen in Supplementary Table 2. Due to the subjective interpretation of some data points, we piloted this process to ensure accurate and consistent interpretation. The Items included from the TIDieR checklist are outlined in Table 1.

As this was a review of trial reporting, rather than of trial findings, a formal quality assessment was not undertaken. Simple summary statistics were used to report the percentage of trials reporting the various aspects of dose.

Patient and public involvement

No patients involved in research project.

Results

After database searching and deduplication, 14661 titles and abstracts were screened for data extraction and 124 full-text articles screened for eligibility, of which 82 were included in the synthesis, see Figure 1 PRISMA flow diagram.

Characteristics of included RCTs

The population and intervention characteristics varied among the RCTs included. With 25 different LTCs investigated across the 82 articles, including diabetes, cancer survivors, COPD, dementia, arthritis, stroke, serious mental illness and HIV. The complex self-management interventions investigated included Chronic Disease Self-Management Program (CDSMP (15)), Arthritis Self-Management Program (ASMP (16)), health education programs (17-19), health education combined with exercise programs (20-22), Cognitive Behavioural Approaches (23, 24), and problem-solving and goal setting (25-27). The number of sessions for the intervention ranged from 2 to over 30. A summary of the LTCs, self-management interventions and number of sessions are presented in Tables 2, 3 and 4, respectively. Further details of all included articles are supplied in Supplementary Table 3, with the full reference list of included trials in Supplementary Figure 2.

Table 2. LTCs investigated in the 82 articles included in the systematic review.

Long Term Conditions Investigated	Number of Trials (%)
Type 1 and/or 2 Diabetes	24 (29%)

Fibromyalgia	2 (2%)
Epilepsy	2 (2%)
Chronic Hepatitis C	1 (1%)
Cancer Survivorship	3 (4%)
Dementia/Neurocognitive disorder	2 (2%)
Hypertension	2 (2%)
Arthritis	9 (11%)
HIV	2 (2%)
Spinal Cord Injury	3 (4%)
COPD	3 (4%)
Amputation	2 (2%)
Stroke	6 (7%)
Multiple Sclerosis	1 (1%)
Psychosis	3 (4%)
Serious Mental Illness	3 (4%)
Heart Failure	3 (4%)
Asthma	2 (2%)
Myocardial Infarction	2 (2%)
Generic Chronic Somatic Disease	1 (1%)
Depression	1 (1%)
Chronic Kidney Disease	2 (2%)
Chronic Fatigue Syndrome	1 (1%)
Coronary Heart Disease	1 (1%)
Skin Picking	1 (1%)
Total	82 (100%)

Table 3. Complex self-management interventions in the 82 trials included in the systematic review.

Complex Self-Management Intervention	Number of Trials (%)
Chronic Disease Self-Management Program	8 (10%)
Health Education	28 (34%)
Health Education Combined with Exercise	10 (12%)
Cognitive and Behaviour Change Approach	9 (11%)
Problem Solving and Goal Setting	14 (17%)
Arthritis Self-Management Program	3 (4%)
Other	10 (12%)
Total	82 (100%)

Table 4. Number of sessions delivered in the 82 trials included in the systematic review.

Number of Sessions	Number of Trials (%)
1	0
2-6	42 (51%)
7-12	26 (32%)
>12	13 (16%)
Unclear	1 (1%)

Total	82 (100%)

Reporting of Dose

Of the 82 trials included, 80 (97.6%) reported the maximum number of sessions that could be delivered, 63 (76.8%) reported the length of these sessions and 19 (23.2%) reported the expected minimum clinically effective dose. Of the 19 reporting the expected minimum clinically effective dose, 8 (42.1%) justified how this had been determined. In addition, 51 (62.2%) reported what dose participants actually received and 40 (48.8%) discussed if this was equal to, or greater than, that scheduled to be delivered in the protocol (fidelity of treatment receipt). It was unclear in 41 articles (50%) whether the expected minimum clinically effective dose had been received by participants, as no detail was provided. Of the 41 studies where this information was present, in 29 (70.7%) participants received the expected minimum clinically effective dose, which for 11 of these (26.8%) was also the maximum dose available.

No improvement in reporting of dose since the publication of the TIDieR checklist was observed. Of the 31 articles published between 2008 and 2014 and the 51 published between 2015 and 2020, 6 (19.4%) and 13 (25.5%), respectively, reported the expected minimum clinically effective dose. Of the 31 articles published between 2008 and 2014 and the 51 published between 2015 and 2020, 22 (71.0%) and 29 (56.9%), respectively, reported the number of sessions received and 15 (48.4%) and 20 (39.2%), respectively, reported the length of sessions received. The percentage of trials reporting the expected minimum clinically effective dose, as number of sessions, and the treatment dose participants received per year are represented in Figure 2.

There was no substantial difference in reporting of expected minimum clinically effective dose or the dose received based on the statistical significance of the trial's primary outcome. Of the 52 articles with a significant primary outcome result and the 30 with a non-significant primary outcome result, 10 (19.2%) and 9 (30%), respectively, reported the expected minimum clinically effective dose. Of the 52 articles with a significant primary outcome result and the 30 with a non-significant primary outcome result, 29 (55.8%) and 22 (73.3%), respectively, reported the dose received.

Discussion

The included trials covered a variety of LTCs and self-management interventions. As expected, almost all of the trials included in this systematic review reported the maximum number of sessions and just over three quarters reported the length of sessions of the complex self-management intervention. Less than a quarter reported the expected minimum clinically effective dose and, when this was reported, less than half explained how this had been determined. Under two thirds reported the number of sessions dose and under half reported length of sessions dose participants received and within these even fewer discussed whether there was fidelity of treatment receipt, i.e. if the dose received was equal to or greater than that specified in the protocol. Improvements in the reporting of the expected minimum clinically effective dose or the dose received were not seen after the TIDieR checklist was published in 2014. There was also no difference in the reporting of these doses depending on whether the primary outcome was statistically significant or not.

Results in Context

In RCTs of complex self-management interventions in patients with LTCs it is often difficult for the maximum dose to be received by all participants, due to the complexity of both the participants' disease and the intervention itself. However, the number of sessions attended and amount of contact with the intervention leader(s) is often associated with improved patient outcomes (18, 28). It is well documented that receiving 4 of the 6 sessions available in CDSMP results in a beneficial clinical effect (29). Of the 8 papers investigating CDSMP in this review, 4 papers discussed this minimum clinically effective dose and only 2 stated it (30, 31). If no minimum clinically effective dose is stated, interpreting whether the dose participants received was greater than, or equal to, the minimum dose needed to see an improvement (fidelity of treatment receipt) is almost impossible, unless all participants receive the maximum dose available, which is uncommon (13). If the minimum clinically effective dose is stated and received by participants, then a negative result might be interpreted as an ineffective intervention. If the dose is not received then a negative result could be due to poor implementation of the intervention, rather than a lack of effectiveness. Therefore, by not reporting the dose received, potentially effective interventions could be abandoned, due to the results not being able to be interpreted in relation to the dose received, resulting in a type ii error (13, 32).

If the dose received is stated and is low, further investigation can be done by trial authors or other researchers to determine why and how it relates to patient outcomes i.e. due to poor trial and/or intervention design. Collecting this information and reporting on it enables those implementing the intervention to know what and how much needs to be received to ensure the best outcomes. In the Ackerman et al. trial (33), 27% of those approached to participate declined, as they could not attend

all 6 sessions, and of those who were recruited many did not attend the ASMP sessions. Many adaptations were made to avoid this, such as booking venues close to participants' homes and scheduling on varying days and times. As the authors provided this detail, future researchers are aware of these potential challenges and, in their trials, could adapt the intervention to be delivered another way i.e. home-based, via telephone or web-based to make it more accessible and improve recruitment and retention. Also, if policy-makers have this information when designing guidelines and making recommendations for scaling up interventions into standard care, effects seen in trials are more likely to be translated into routine care (34-36).

In addition, researchers must take the time within the early developmental phases of an intervention to ensure the expected minimum clinically effective dose is estimated as accurately as possible, through pilot studies, systematic reviews and / or longitudinal research (9). Although difficult, this focus on early development would prevent fully funded RCTs going ahead when the minimum clinically effective dose has not been determined or measured, potentially resulting in type ii error.

Even when fidelity is mentioned within trial papers, the focus is often on how it was assessed rather than the actual findings, limiting the use of fidelity data to interpret the trial findings, and making the fidelity assessment almost useless (37-39). Understanding the reasons why fidelity is poorly reported is complex, but it is thought to be attributed to lack of knowledge and the practicalities of comprehensively assessing fidelity within an RCT (40). Despite the extra resources needed to conduct a full assessment of fidelity, the economic and scientific costs of not completing and

reporting fidelity outcomes are far greater (13). Variations in intervention delivery within trials may influence efficacy and result in biased conclusions.

Although the TIDieR checklist was designed to improve reporting of interventions, no improvement in the reporting of the expected minimal clinically effective dose and dose received and discussion of the fidelity of the treatment received was found in this review. Also, within the articles, there was little to no mention of the TIDieR checklist and reporting of interventions in accordance with it. This is in line with other systematic reviews investigating the implementation of the TIDieR checklist into trial reporting. Investigating implementation in the cardiovascular medicine literature, Palmer et al. (2020) (41) found over one fifth failed to report the dose of the treatment received (Item 11). Within behaviour change research similar results to this review have been found (42), with the maximum dose available always reported, but other elements of dose poorly described.

Researchers may be less familiar with the TIDieR checklist, due to the dissemination being less extensive than other reporting guidelines e.g. CONSORT and PRISMA (41). Therefore, broader dissemination of the TIDieR checklist or incorporating the checklist within Item 5 of the CONSORT statement, could improve reporting, as the information would be required by journals for publication (41). Poor implementation of the TIDieR checklist could also be due to the guidelines being too broad and generic and difficult for authors to adapt to their own interventions (43). Making the TIDieR checklist clearer and developing customised versions for specific intervention types could increase implementation of the checklist guidelines and ultimately improve intervention description and reporting (44) .

Limitations

The subjective nature of determining the eligibility of trials based on whether the intervention was a complex self-management intervention, could have introduced bias. All those marked potentially eligible were discussed by the study team to limit any potential bias and if there were any doubts the paper was included for data extraction. If consensus on eligibility could not be met, the paper was sent to a third reviewer (ST), with extensive experience in self-management support interventions for a final decision. Through these discussions decisions around eligibility for inclusion were as consistent as possible given the flexible and varied definition of complex self-management interventions within the literature.

Also, a formal quality assessment was not completed, as we were not looking at the outcome measures. It could be of interest to compare the quality of study with the accuracy of dose reporting, but this was not within the scope and capacity of this review.

Future Research

Following this review, reporting standards of complex self-management intervention doses do not appear to have improved since the publication of the TIDieR checklist. Ensuring that guidelines provide recommendations for how to define and assess dose within complex self-management interventions is vital for accurate reporting and so, interpretation and implementation of trial results. Therefore, either the TIDieR checklist should be updated or novel, specialised methodological guidelines developed to ensure that dose in these trials is determined, measured and reported

as accurately as possible. Additionally, looking at whether quality of study correlates to quality of reporting dose could be completed.

Conclusion

Reporting of the minimum clinically effective dose, the dose received in the trial and the fidelity of treatment receipt are not consistent in studies of complex self-management interventions for LTCs. Although this detail is outlined in the TIDieR checklist, published in 2014, there has been no improvement in reporting following its publication. Currently we recommend that when publishing RCTs, researchers should describe the intervention dose according to the TIDieR checklist. This will enable clinicians and policy-makers to reliably replicate the interventions in future trials and/or interpret findings to implement them into practice. Going forward, the TIDieR checklist could be made clearer with versions for specific intervention types and wider dissemination of the checklist to increase implementation of the guidelines and improve intervention reporting. To facilitate this, funders, reviewers and journal editors should encourage dose and fidelity of treatment receipt to be collected and discussed, to increase reporting in this way.

Abbreviations

RCT: Randomised controlled trial; LTC: Long-term condition; TIDieR: Template for intervention description and replication; CDSMP: Chronic disease self-management program; ASMP: Arthritis self-management program

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Competing interests

The authors declare that they have no competing interests

Data sharing

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Author contributions

TR, supervised by ST and RT, designed the review and conducted the searches, data extraction, and analysis. TR and AB undertook double screening and data extraction. The authors read and approved the final manuscript.

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Figure legends

Figure 1. PRISMA Systematic Review Flow Diagram

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

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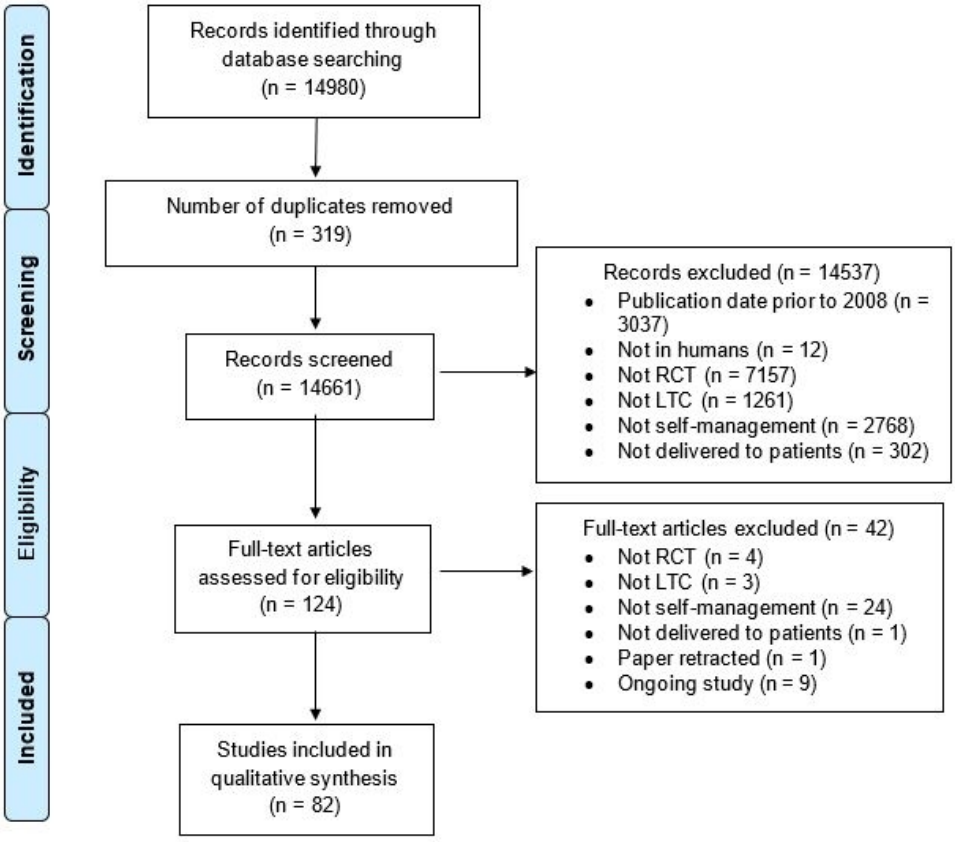

Figure 1. PRISMA Systematic Review Flow Diagram

Figure 1. PRISMA Systematic Review Flow Diagram

167x159mm (96 x 96 DPI)

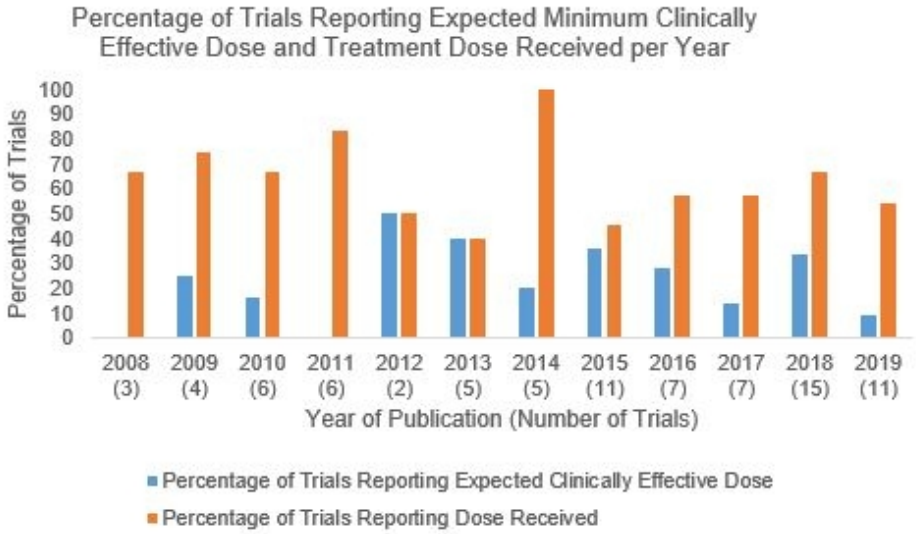

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

134x77mm (96 x 96 DPI)

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2-3
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4-7
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	7
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	8
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	7
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Supplementary figure 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	8-9
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	9 and supplementary table 2
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	9
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	9
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	10
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	8-9
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	N/A
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	9
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	N/A

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	10 and figure 1
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/A
Study characteristics	17	Cite each included study and present its characteristics.	10-11 and supplementary figure 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	N/A
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	N/A
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	N/A
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	14-16
	23b	Discuss any limitations of the evidence included in the review.	17
	23c	Discuss any limitations of the review processes used.	17
	23d	Discuss implications of the results for practice, policy, and future research.	17-18
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	3
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	19
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	19
Competing interests	26	Declare any competing interests of review authors.	19
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	19 and supplementary table 3

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

Supplementary Table 1: Example of data extraction (including study details, intervention details and dose / fidelity reporting)

Study Title	
Year, Author, Country, Link	Year after 2008?: Yes ☐ No ☐ If No stop and log as reason for exclusion TIDieR checklist (2014): Before ☐ After ☐
Pre-extraction Screening	Needs translating: Yes ☐ No ☐ If Yes stop and log RCT: Yes ☐ No ☐ In No stop and log as reason for exclusion Self-management intervention: Yes ☐ No ☐ If No stop and log as reason for exclusion Participants with LTCs: Yes ☐ No ☐ If No stop and log as reason for exclusion Ongoing study: Yes ☐ No ☐ If Yes stop, log and consider contacting author
Research Question / Aim	

Methods:

Intervention Summary Features	CDSMP ☐ ASMP ☐ EPP ☐ Other ☐ Specify if known Disease specific ☐ or Generic ☐ LTCs included: Delivered by: Health care professional ☐ Lay person ☐ Other ☐ Specify if known Individual one-to-one sessions: Yes ☐ No ☐ Group sessions: Yes ☐ No ☐ Number in group: Face-to-Face sessions ☐ / Remote sessions ☐ Location where is the intervention delivered: Inpatient ☐ Outpatient ☐ Community Based ☐ Home ☐ Unclear ☐ Other ☐ Specify if known Description: Any necessary components for adherence:
Dose of Intervention Adherence and compliance	Maximum dose: Number of sessions: Session Duration (hours): Total hours: Duration intervention delivered over: Anticipated clinically effective dose: Number of sessions: Session Duration (hours): Total hours:

may be used synonymously, but the distinction and data needs to be teased out	How clinically effective dose decided by authors: Author comments on Adherence (the number of sessions participants attended): Author comments on Compliance (the number of sessions participants need to attend to be including in the analysis):
Fidelity of Intervention	Did the study describe attempts to ensure fidelity of the interventions i.e. what was delivered was what was intended to be delivered: Yes ☐ No☐ Not stated/unclear ☐ If Yes, specify: Comments / Additional details:

Results:

Dose of Intervention	Dose actually delivered: Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over: Dose actually received (specifically for groups): Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over: Was the dose delivered ≥ anticipated clinically effective dose: Yes ☐ No ☐ Unclear ☐ Details: Further author comments on dose:
Fidelity of Intervention	Was there fidelity around the dose in the trial?: Yes ☐ No ☐ Unclear ☐ Was fidelity reported on in?: Yes ☐ No ☐ Unclear Do the authors discuss the impact of fidelity?: Yes ☐ No ☐ Unclear ☐ Further author comments on fidelity:
Primary Outcome Result	Was the Primary Outcome Statistically Significant: Yes ☐ No ☐ Details: Was the Primary Outcome Clinically Significant: Yes ☐ No ☐ Unclear ☐ Details:

Supplementary Table 2. Full details of all 82 articles included in the systematic review

First Author	Year	Country	Intervention	Disease	Delivered by	Location	Maximum dose stated (number of sessions)	Maximum dose stated (length of sessions)	Anticipated Clinically Effective dose stated	Dose actually delivered stated (number of sessions)	Dose actually delivered stated (length of sessions)	Was dose delivered ≥ anticipated clinically effective dose	Was fidelity reported and discussed?	Was the primary outcome statistically significant?
Ackerman	2012	Australia	ASMP	Hip or Knee Osteoarthritis	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Ambrosino	2008	USA	Coping skills training - learning to deal better with day-to-day problems that arise,	Type 1 Diabetes	HCPs	Unclear	Yes	Yes	No	Yes	Yes	Unclear	No	No
Anvar	2018	Iran	ASMP	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Bantum	2014	USA	Surviving and Thriving with Cancer website adapted from CDSMP	Cancer survivors	Lay leaders	Web-based	Yes	No	No	Yes	No	Yes	Yes	Yes
Berry	2015	USA	Diabetes group visits - an individualized session to review medications and a medical examination and a group session for diabetes self-management education	Diabetes	HCPs	Community based	Yes	No	No	No	No	Unclear	No	Yes
Bersani	2017	Italy	group psychoeducation focused on healthy lifestyle - including sleep, physical activity, diet, voluptuary habits	Mood and Psychotic disorders	HCPs	Outpatient clinic	Yes	Yes	No	No	Yes	Unclear	No	Yes
Bosworth	2008	USA	Tailored behavioural intervention with 9 educational modules	Hypertension	HCPs	Telephone	Yes	No	No	Yes	Yes	Yes	Yes	No
Breedland	2011	The Netherlands	FIT program - physical activity combined with an education program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Brorsson	2019	Sweden	Guided Self-Determination-Young (GSD-Y) a person-centered communication and reflection education model	Type 1 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes

			that can be used in educational program											
Chamany	2015	USA	Telephone support through problem solving and goal setting	Diabetes	HCPs	Telephone	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Chen	2018	China	Patient-centered self-management empowerment intervention (PCSMEI)	Stroke	HCPs	Inpatient, Outpatient and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Chew	2018	Malaysia	Value-based emotion-focused educational programme (VEMOFIT)	Type 2 Diabetes	HCPs	Other: Health Clinic	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Christiansen	2018	USA	A behaviour change intervention based on social cognitive and control theories of behavior change targeting physical exercise, walking activity, and disease self-management	Dysvascular Amputation (Unilateral TTA)	HCPs	Telephone	Yes	Yes	No	Yes	Yes	Yes	No	No
Cook	2013	USA	Wellness Recovery Action Planning including lectures, individual and group exercises, personal sharing and role modeling, and voluntary homework	Serious Mental Illness	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Corado	2018	USA	Active, Linkage, Engagement, Retention and Treatment (ALERT) opics included HIV health literacy, Navigating the Health Care System, Disclosure, Adherence, and Self-Efficacy	HIV	HCPs	Outpatient clinic and Community	Yes	No	No	Yes	No	Unclear	Yes	No
Dash	2015	India	Epilepsy health education program designed for those from a low education background.	Epilepsy	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Detaille	2013	The Netherlands	CDSMP adapted for workers with chronic disease	A diagnosed chronic somatic disease	Lay leaders	Community based	Yes	Yes	Yes	No	No	Unclear	No	Yes

Dinh	2019	Vietnam	Teach-back heart failure self-management intervention individual teach-back before discharge, plus a booklet, a weighing scale, a diary, and a telephone call follow-up at 2 weeks following discharge	Heart failure	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Dziedzic	2013	UK	Looking after your joints programme - Self Management in OA of the Hand (1) joint protection; (2) hand exercises; (3) joint protection and hand exercises combined	Hand Osteoarthritis	HCPs	Outpatient clinic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ehde	2015	USA	Telephone delivered self-management intervention - cognitive-behavioral and positive psychology strategies for helping participants self-manage pain, depression, and fatigue	Multiple Sclerosis	HCPs	Telephone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Fernandez Guijarro	2019	Spain	Health-promotion programme covering healthy eating, lifestyle changes, physical activity, hydration, tobacco and alcohol consumption, stress reduction, and sleep quality and nurse led physical activity.	Serious Mental Illness	HCPs	Community based	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Ferrone	2019	Canada	Integrated disease management - case management, education, and skills training	COPD	HCPs	GP practice and telephone	Yes	No	No	Yes	No	No	Yes	Yes
Forjuoh	2014	USA	CDSMP and PDA	Type 2 Diabetes	Lay leaders	Clinic and community	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Fukuoka	2019	Japan	Disease management program - nurses worked with the subjects and their to achieve individualized clinical target values and goals through education booklets and journal.	Stroke	HCPs	Unclear	Yes	No	No	No	No	Unclear	No	No

Gallinat	2019	Germany	CBT techniques covering psychoeducation, self-management, supportive monitoring and counselling	Skin Picking	HCPs	Web-based	Yes	No	No	Yes	No	No	No	Yes
Geremia	2019	Brazil	Compact, cost-effective, education program (CEPT1)	Type 1 Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Goldberg	2013	USA	CDSMP adapted for psychiatric settings 'Living Well'	Serious Mental Illness with comorbid chronic medical condition	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	No	Yes	Yes	No	No	Yes
Golshahi	2015	Iran	Hypertension self-management - Group A educated about self-care behaviors through eight sessions, group B and group C educated through four pamphlets or eight SMS.	Hypertension	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Grammatopoulou	2016	Greece	Holistic Intervention - recognise facilitators and barriers faced to develop the necessary behaviors and skills to control their disease	Asthma	HCPs	Outpatient clinic and home	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Groessl	2010	USA	CDSMP adapted for veterens	Chronic Hepatitis C	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Grønning	2012	Norway	Arthritis out Patient Educational Program	Polyarthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Harington	2010	UK	Exercise and education scheme through exercise, guest speakers, goal-setting and social session	Stroke	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Heutink	2011	The Netherlands	CONECSI (COping with NEuropathiC Spinal cord Injury pain) comprises educational, cognitive, and behavioural elements targeted at coping with CNSCIP	Spinal cord injury	HCPs	Rehabilitation Centre	Yes	Yes	No	Yes	Yes	Yes	No	No

Hewlett	2011	UK	CBT, problem solving and goal setting for fatigue and well-being self-management	Rheumatoid Arthritis	HCPs	Unclear (Face-to-face)	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Holt	2019	UK	STEPWISE - Each session covered lifestyle changes to help the participants take control of their weight through problem solving	schizophrenia, schizoaffective disorder or first-episode psychosis	HCPs	Community based and telephone	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Houlihan	2017	USA	My Care My Call - promote skill development and facilitate motivation using consumer-centered goal-setting and coaching, education, resource referral, and support-network building	Spinal cord injury	Lay leaders	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes
House	2018	UK	Standardized supported self-management - goal setting, resources and barriers influencing success in reaching goals, and self-monitoring of goal attainment	Type 2 Diabetes with intellectual disability	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jaipakdee	2015	Thailand	Diabetes self-management support (DSMS) with a computer-assisted instruction	Diabetes	HCPs	Community based	No	Yes	No	No	No	Yes	No	Yes
James	2015	Australia	ENRICH: Exercise and Nutrition Routine Improving Cancer Health	Cancer survivors	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Jiang	2019	China	Self-efficacy-focused structured education programme provided diabetes-related knowledge and DSM skills based on self-efficacy theory	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
John	2013	UK	Cognitve Behavioural Education Programme - challenge their way of thinking, changing maladaptive coping skills, cognitions or emotions to lead to more adaptive changes in behaviour	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Ju	2018	China	Peer support provided with usual education	Diabetes	Lay leaders	Community based	No	No	No	No	No	Unclear	No	Yes

Kasteleyn	2015	The Netherlands	Three home visits by a diabetes nurse to increase self-efficacy and illness perceptions	Type 2 Diabetes and first accute coronary event	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Kessler	2018	France, Germany, Italy, Spain	Adapted Living well with COPD Programme - home monitoring and e-health through telephone/web platform	COPD	HCPs	Home and Telephone and web-based platform	Yes	No	Yes	Yes	No	Yes	Yes	No
Kooijmans	2017	The Netherlands	HABITS intervention - optimizing intentions toward a healthier lifestyle and improving perceived behavioral control	Spinal cord injury	HCPs	Community based and home	Yes	No	No	Yes	No	Yes	Yes	No
Laakkonen	2016	Finland	Self-management group rehabilitation to enhance participants' mastery, self-efficacy, and problem-solving skills and to empower them	Dementia	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Luciano	2011	Spain	Psychoeducation Program included information about symptoms, comorbid conditions, potential causes, psychosocial factors, current treatments, exercise, and barriers to behavior change and training for relaxation, pain relief, and stress reduction	Fibromyalgia	HCPs	GP practice	Yes	Yes	No	Yes	Yes	No	No	Yes
Ludman	2016	USA	self-management support service – depression self-management training, recovery coaching, and care coordination	Depression	HCPs and Lay leaders	Community based and telephone	Yes	No	Yes	Yes	No	No	Yes	Yes
Manning	2014	UK	Education, Self-Management, and Upper Extremity Exercise Training in People with Rheumatoid Arthritis [EXTRA] program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	No	Yes	No	Yes
Mansouri	2019	Iran	Oral and Written Education Program	Heart failure	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes

Markle-Reid	2018	Canada	The program offered up to 3 in-home visits; monthly group wellness sessions; monthly case conferences; and ongoing nurse-led care coordination.	Type 2 Diabetes with 3+ comorbidites	HCPs and Lay leaders	Community based and home	Yes	No	No	Yes	No	Unclear	Yes	No
Marsden	2009	Australia	Community Living After Stroke for Survivors and Carers' (CLASSiC) - each session included a 1-hour physical activity followed by a 1-hour education delivered via presentations, group discussions and group activities	Stroke	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No
Mohammadpour	2015	Iran	A supportive educational intervention plus follow up telephone calls with information on functions of cardiovascular system, aetiology, management of MI risk factors, adherence to treatment and dietary regimens	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Muchiri	2016	South Africa	Nutrition Education Programme	Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	No
Nguyen	2018	Vietnam	CKD booklet and a handout, one face-to-face session and two brief follow-up sessions.	Chronic Kidney Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
P´erez-Escamilla	2015	USA	Culturally tailored diabetes education and counselling treatment group including education, skills, and support in the areas of nutrition, physical activity, blood glucose monitoring, medication adherence, and medical appointments.	Type 2 Diabetes	HCPs	Home	Yes	No	No	No	No	Unclear	Yes	Yes
Pinxsterhuis	2017	Norway	self-management program for coping with their illness and dealing with healthcare professionals and family, developed through educational presentations, the exchange of experiences,	Chronic fatigue syndrome	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No

			modelling of self-management skills, guided mastery practice, and informative feedback.											
Ridsdale	2018	UK	Self-management education for people with poorly controlled epilepsy (SMILE [UK]), based on MOSES	Epilepsy	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Rothschild	2014	USA	Mexican American Trial of Community Health Worker (MATCH) knowledge and skills in diabetes self-management, with opportunities to practice goal setting and self-management.	Type 2 Diabetes	HCPs	Home	Yes	Yes	No	Yes	No	No	Yes	Yes
Sajatovic	2018	USA	TargetEd MAnageMent Intervention [TEAM]	Stroke and TIA	HCPs and Lay leaders	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Unclear	No	Yes
Salyers	2014	USA	Illness management and recovery - Incorporating psychoeducation, cognitive-behavioral approaches, relapse prevention, social skills training, and coping skills training.	Schizophrenia or schizoaffective disorder	HCPs	Community based	Yes	No	No	Yes	No	No	Yes	No
Smeulders	2010	The Netherlands	CDSMP	Congestive Heart Failure	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	No	Unclear	No	No
Spencer	2011	USA	Racial and Ethnic Approaches to Community Health (REACH) Initiative - setting patient specific goals and supporting their progres	Diabetes	HCPs	Outpatient clinic and Home and Telephone	Yes	Yes	No	Yes	Yes	No	No	Yes
Stuifbergen	2010	USA	The Lifestyle Counts intervention developed from the Wellness for Women with MS curriculum	Fibromyalgia	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Yes	No	No
Swoboda	2016	USA	Multiple-Goal Intervention - combination of goal setting and decision support coaching	Diabetes	HCPs	Outpatient clinic and Telephone	Yes	No	Yes	Yes	No	No	No	Yes

Taggart	2017	UK	DESMOND-ID (Diabetes and Self-Management for Ongoing and Newly Diagnosed for patients with Type 2 diabetes)	Type 2 Diabetes with intellectual disability	HCPs	Community based	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Thoolen	2009	The Netherlands	Beyond Good Intentions – a 12 week self-management course	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Van der Meer	2009	The Netherlands	Internet based self-management program sthma control monitoring and treatment advice, online and group education, and remote Web communications with a specialized asthma nurse.	Asthma	HCPs	Web-based and Unclear	Yes	Yes	No	Yes	No	Unclear	No	Yes
Van Rooijen	2010	South Africa	Dietary and physical activity education for ongoing nutrition self-management and physical activity	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	No	No	No	No	Unclear	No	Yes
Vos	2019	The Netherlands	Beyond Good Intentions	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Walker	2011	USA	Telephonic behavioural intervention focused on medication adherence and lifestyle changes through healthy eating and physical activity	Diabetes	HCPs	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes
Wang	2016	Singapore	The Myocardial Infarction Home-based Self-management Programme (MIHSMP) with Heart Recovery Education Booklet (HREB)	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wang	2018	Singapore	Coronary Heart Disease Self-management Programme (CHDSMP)	Coronary Heart Disease	HCPs	Home and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Webel	2010	USA	Positive Self-Management Program (PSMP)	HIV	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	No
Wegener	2009	USA	Promoting Amputee Life Skills Self-management program	Limb loss	HCPs and Lay leaders	Community based	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Wolf	2017	USA	CDSMP	Stroke	HCPs	Outpatient clinic	Yes	Yes	Yes	No	No	Unclear	No	No
Wu	2017	Australia and Taiwan	T-CDSMP adapted for Taiwanese speaking	Cardiovascular disease and Diabetes	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wu	2018	Taiwan	Innovative self-management intervention a video, trainee manual, participation in the self-efficacy- enhancing program, and telephone interviews	End Stage Renal Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Yip	2008	Hong Kong	ASMP with added goal-directed exercise component	Osteoarthrits	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Young	2016	China	Psycho-education group understanding dementia, coping skills, exercise, diet, mood, own strengths, accepting change, communication, relationships, the future	Major neurocognitive disorder	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Zakrisson	2018	Sweden	Self-management intervention based on Bandura's theory of self-efficacy using techniques such as performance mastery, modelling, interpretation of symptoms, and social persuasion	COPD and Coronary Heart Failure	HCPS	Community based	Yes	Yes	No	Yes	Yes	Unclear	Yes	No
Zhang	2015	USA	Stay Dry program biofeedback pelvic floor muscle exercise plus a support group or telephone contact	Prostate cancer with urinary incontinence	HCPs	Telephone and unclear	Yes	Yes	No	No	No	Unclear	No	Yes

Supplementary Figure 1. Medline, AMED, PsychINFO and CINAHL Full Search Strategies.

Medline Search Strategy

1. (Long term adj3 condition*).mp.
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. exp cardiovascular diseases/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. exp lung diseases obstructive/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. exp emphysema/
12. exp pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. exp nervous system diseases/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal diseases/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. exp nutrition disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. exp rheumatic diseases/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. exp thyroid diseases/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp hiv infections/

43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp behavio?ral symptoms/
46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction/
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. randomized controlled trial/ or pragmatic clinical trial/
68. randomi?ed controlled trial.mp.
69. controlled clinical trial/
70. randomized controlled trial/
71. double-blind method/ or random allocation/ or single-blind method/
72. Clinical Trials as Topic/
73. placebo.mp.
74. randomi?ed.mp.
75. Drug Therapy/
76. drug therapy.mp.
77. randomly.mp.
78. clinical trial/
79. trial.mp.
80. groups.mp.

81. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80
82. exp animals/ not humans.sh.
83. (#81 not #82).mp.
84. 50 and 66 and 83

AMED Search Strategy

1. (Long term adj3 condition*).mp. [mp=abstract, heading words, title]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).mp. [mp=abstract, heading words, title]
4. long term care/
5. long* term care.tw.
6. Cardiovascular disease/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. lung disease/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. emphysema/
12. pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. (brain adj (disease* or damage* or injur*)).tw.
16. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
17. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
18. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
19. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
20. (hearing loss or deaf* or blind*).tw.
21. down* syndrome.tw.
22. cerebral palsy.tw.
23. exp gastrointestinal disease/
24. exp nervous system disease/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. ((renal or kidney) adj (failure* or insufficienc*)).tw.
27. diabetes mellitus/
28. (diabetes or diabetic*).tw.
29. exp nutrition disorders/
30. (underweight or malnutrition or malnourished).tw.
31. exp arthritis/
32. exp rheumatic disease/
33. fibromyalgia.tw.
34. ((back or neck) adj pain).tw.
35. exp thyroid disease/
36. thyroid.tw.
37. exp hypersensitivity/
38. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
39. exp neoplasms/
40. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.

41. exp hiv infections/
42. (hiv infect* or hiv disease*).tw.
43. exp mental disorders/
44. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
45. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
46. (psychos?s or psychotic* or paranoi* or schizo* or neuros?s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
47. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
48. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47
49. self efficacy/ or self care/
50. self administration/ or self assessment/ or self concept/
51. patient compliance/ or patient education/ or patient participation/
52. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
53. life style/ or disease management/ or risk reduction behavio?r/
54. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
55. (consumer health information or consumer participation).mp. [mp=abstract, heading words, title]
56. health plan implementation.mp.
57. (self care or self management or self efficacy or self monitor$).tw.
58. ((self or oneself) adj3 care).tw.
59. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
60. (health adj5 (promot$ or educat$ or behav$)).tw.
61. (risk adj3 reduc$ adj3 behav$).tw.
62. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
63. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
64. 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63
65. randomized controlled trial.pt.
66. controlled clinical trial.pt.
67. randomized.ab.
68. placebo.ab.
69. randomly.ab.
70. clinical trials.sh.
71. trial.ti.
72. 65 or 66 or 67 or 68 or 69 or 70 or 71
73. exp animals/ not humans.sh.
74. 72 not 73
75. 48 and 64 and 74

PsychINFO Search Strategy

1. (Long term adj3 condition*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
7. sickle cell.mp.
8. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
9. exp emphysema/
10. exp pulmonary emphysema/
11. emphysema.tw.
12. (cystic fibrosis or respiratory distress).mp.
13. exp nervous system disorders/
14. exp cardiovascular disorders/
15. exp lung disorders/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal disorders/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. eating disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. rheumatoid arthritis/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. thyroid disorders/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp AIDS/ or exp HIV/
43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp Behavior Problems/ or behavio?ral symptoms.mp.

46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction.
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. exp Randomized Controlled Trials/
68. exp Clinical Trials/
69. exp Randomized Controlled Trials/ or exp Randomized Clinical Trials/
70. exp Placebo/
71. exp Drug Therapy/
72. randomly.mp.
73. trial.mp.
74. groups.mp.
75. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74
76. exp animals/ not humans.sh.
77. (#75 not #76).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
78. 50 and 66 and 77

CINAHL Search Strategy

S1. long term condition

S2. chronic
S3. ((persistent or long term or ongoing or degenerative) (disease or ill* or condition or insufficienc* or disorder))
S4. long term care
S5. cardiovascular diseases
S6. (heart disease or heart failure or myocardial ischemia or coronary disease or coronary artery disease or myocardial infarction or hypertension or high blood pressure)
S7. sickle cell
S8. lung diseases, obstructive
S9. (obstructive lung disease or obstructive pulmonary disease or copd or asthma or bronchitis)
S10. down* syndrome
S11. cerebral palsy
S12. emphysema
S13. gastrointestinal disorders
S14. renal insufficiency
S15. ((renal or kidney) failure)
S16. diabetes mellitus
S17. nutrition disorders
S18. arthritis
S19. rheumatic diseases
S20. fibromyalgia
S21. (cystic fibrosis or respiratory distress)
S22. thyroid disease
S23. (hypersensitivity or allergy or anaphylaxis)
S24. (cancer* or oncolog* or neoplasm* or tumo?r*)
S25. (hiv infection or hiv disease or hiv)
S26. mental disorders
S27. ((mental or psychiatric or psychological) (ill* or disorder or disease or distress or disability))
S28. ((personality or dysthymic or anxiety or stress or eating or reactive or behavio?r or perception or impulse control or developmental or attention deficit or hyperactivity or conduct or motor skills or movement or tic) disorder
S29. (psychosis or schizophrenia or neurosis or depression or bipolar or mania or obsessive or compulsive or panic or phobia or anorexia or bulimia or dissociative or autism or Asperger's or Tourette or affective or borderline or suicide or self injury or self harm or adhd)
S30. ((substance or drug or alcohol) abuse or addiction) or alcoholism
S31. self efficacy or self care
S32. nervous system diseases
S33. self administration or self assessment or self concept
S34. patient compliance or patient education or patient participation
S35. consumer health information or consumer participation
S36. attitude to health or health behavio?r or health education or health promotion
S37. disease management or risk reduction behavio?r
S38. health plan implementation
S39. self care or self management or self efficacy
S40. ((patient or consumer or health) (education or participation or behavio?r or compliance or disease management))
S41. (((behavio?r change) or (problem solving) or (goal setting) or (decision making) or coping or motivation) (patient or consumer))
S42. (brain (disease or damage or injury))
S43. MH randomized controlled trials
S44. MH double-blind studies
S45. MH single-blind studies

S46. MH random assignment
S47. MH pretest-posttest design
S48. MH cluster sample
S49. TI (randomised OR randomized)
S50. AB (random*)
S51. TI (trial)
S52. MH (sample size) AND AB (assigned OR allocated OR control)
S53. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease or stroke or epilepsy or seizure)
S54. MH (placebos)
S55. PT (randomized controlled trial)
S56. AB (CONTROL W5 GROUP)
S57. MH (CROSSOVER DESIGN) OR MH (COMPARATIVE STUDIES)
S58. AB (CLUSTER W3 RCT)
S59. S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S54 OR S55 OR S56 OR S57 OR S58
S60. MH ANIMALS+
S61. MH (ANIMAL STUDIES)
S62. TI (ANIMAL MODEL*)
S63. S60 OR S61 OR S62
S64. (neurodegenerative or Huntingdon's or Parkinson's or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease)
S65. MH (HUMAN)
S66. S63 NOT S65
S67. S59 NOT S66
S68. ((communication or learning or speech or vision or hearing or psychomotor) disorder)
S69. (deaf or blind)
S70. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S32 OR S42 OR S53 OR S64 OR S68 OR S69
S71. S31 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41
S72. S67 AND S70 AND S71
S73. S67 AND S70 AND S71

Supplementary Figure 2. Reference list for the 82 eligible articles included in this systematic review.

1. Ackerman IN, Buchbinder R, Osborne RH. Challenges in evaluating an Arthritis Self-Management Program for people with hip and knee osteoarthritis in real-world clinical settings. J Rheumatol. 2012;39(5):1047-55.
2. Ambrosino JM, Fennie K, Whittemore R, Jaser S, Dowd MF, Grey M. Short-term effects of coping skills training in school-age children with type 1 diabetes. Pediatric diabetes. 2008;9(3 Pt 2):74-82.
3. Anvar N, Matlabi H, Safaiyan A, Allahverdipour H, Kolahi S. Effectiveness of self-management program on arthritis symptoms among older women: A randomized controlled trial study. Health Care for Women International. 2018;39(12):1326-39.
4. Bantum EOC, Albright CL, White KK, Berenberg JL, Layi G, Ritter PL, et al. Surviving and thriving with cancer using a Web-based health behavior change intervention: randomized controlled trial. Journal of Medical Internet Research. 2014;16(2):e54-12.
5. Berry DC, Williams W, Hall EG, Heroux R, Bennett-Lewis T. Imbedding Interdisciplinary Diabetes Group Visits Into a Community-Based Medical Setting. Diabetes Educator. 2016;42(1):96-107.
6. Bersani FS, Biondi M, Coviello M, Fagiolini A, Majorana M, Minichino A, et al. Psychoeducational intervention focused on healthy living improves psychopathological severity and lifestyle quality in psychiatric patients: preliminary findings from a controlled study. Journal of Mental Health. 2017;26(3):271-5.
7. Bosworth HB, Olsen MK, Dudley T, Orr M, Goldstein MK, Datta SK, et al. Patient education and provider decision support to control blood pressure in primary care: a cluster randomized trial. American heart journal. 2009;157(3):450-6.
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Reporting dose in complex self-management support interventions for long-term conditions: is it defined by researchers and received by participants? - a systematic review

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Reporting dose in complex self-management support interventions for long-term conditions: is it defined by researchers and received by participants? - a systematic review

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Abstract:

Background: The minimum clinically effective dose, and whether this is received in randomised controlled trials (RCTs) of complex self-management interventions in Long-Term Conditions (LTCs), can be unclear. The Template for Intervention Description and Replication (TIDieR) checklist states that dose should be clearly reported to ensure validity and reliable implementation.

Objectives: To identify whether the expected minimum clinically effective dose, and the dose participants received is reported within research articles and if reporting has improved since the TIDieR checklist was published.

Methods: Four databases were systematically searched (MEDLINE, PsycINFO, AMED and CINAHL) to identify published reports between 2008 and 2020 for RCTs investigating complex self-management interventions in LTCs. Data on reporting of dose was extracted and synthesised from the eligible articles.

Results: 82 articles covering various LTCs including diabetes, stroke and arthritis were included. Most complex interventions involved behaviour change combined with education and/or exercise. The maximum dose was usually reported (n=80; 97.6%), but the expected minimum clinically effective dose and the dose received were reported in only 19 (23.2%) and 52 (62.2%) of articles, respectively. Reporting of the expected minimum clinically effective dose and the dose participants received did not improve following the publication of the TIDieR checklist in 2014.

Conclusions: Interpreting results and implementing effective complex self-management interventions is difficult when researchers' reporting of dose is not in line with guidelines. If trial findings indicate benefit from the intervention, clear reporting of dose ensures reliable implementation to standard care. If the results are non-significant, detailed reporting enables better interpretation of results i.e., differentiating between poor implementation and lack of effectiveness. This ensures quality of interventions and validity and generalisability of trial findings. Therefore, wider adoption of reporting the TIDieR checklist dose aspects is strongly recommended. Alternatively, customised guidelines for reporting dose in complex self-management interventions could be developed.

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Keywords: dose; reporting; complex self-management intervention; long-term condition; systematic review; TIDieR checklist; fidelity

Strengths and limitations of this study:

- This is the first systematic review to explore whether dose is being reported as the guidelines recommend in randomised trials of self-management interventions.
- Double screening and data extraction was completed, following piloting, ensuring all eligible papers were included and accurate data extracted.
- Determining complex self-management study eligibility was challenging, but we developed a systematic approach to limit potential bias.
- Quality assessment of eligible papers was not conducted, but it could have been interesting to see if quality of study correlated with quality of reporting.

Background:

It is estimated that 30% of the UK population live with a Long-Term Condition (LTC) and that LTCs account for 70% of health and social care spending within the NHS (1). This prevalence extends globally, where LTCs are the leading cause of ill health and result in 70 percent of all deaths (2), with a growing awareness of the importance of monitoring prevalence and developing interventions to overcome LTCs, due to the aging population, predicted increase in LTCs and the associated costs (3, 4). Therefore, the management of LTCs is a priority for the NHS. LTCs are defined as “diseases of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors" (5). The current evidence base suggests LTC treatment should focus on supporting effective self-management to result in better health outcomes (6). Self-management here is defined in conjunction with the US Institute of Medicine definition, echoed by the Department of Health; “Self-management is defined as the tasks that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their conditions.” (7, 8).

Complex self-management interventions are known to improve a variety of health outcomes in LTCs, including self-efficacy (confidence in ability to execute specific behaviours), patient activation (confidence, skills and knowledge to manage their own health care), self-rated health, clinical outcomes and social outcomes (9). Complex self-management interventions contain several interacting components that aim to change patients’ behaviour. However, determining which parts of the complex intervention are necessary to result in a potential benefit can be difficult. Therefore,

complex self-management interventions should go through stages of development before being evaluated, typically in randomised control trials (RCTs), to identify how much of which components result in the best outcomes (10). Once decided upon, at least the expected minimum clinically effective dose of the complex self-management intervention should be compared to standard care for the LTC to see if health outcomes improve. However, in published reports of RCTs it is often unclear how the minimum clinically effective dose of the intervention was determined or, indeed, what the researchers believe the expected minimally clinically effective dose to be.

The concept of dose refers to the number of intended units of each intervention (dose delivered) and the extent of engagement of participants with the intervention (dose received) (11). Treatment fidelity refers to the extent to which the intervention is delivered as expected, how much of the intervention is received and the amount of treatment enactment of the intervention by participants. Focussing on fidelity of treatment receipt, if the number and length of sessions received is in line with that stated in the protocol, it is essential researchers determine what they think the minimum clinically effective dose is and measure if it is received by participants within the trial, so fidelity of treatment receipt can be assessed (12, 13). This is determined through discussions between those involved in the development of the intervention, to decide what they expect the minimum number of sessions attended are needed to result in a meaningful change. There are two possible explanations for why this information is not reported, either researchers are not having these conversations during intervention development, or they are not reporting what this should be in their methods and papers. Collecting and reporting this information

ensures the quality and integrity of the intervention and enables assessment of how valid and generalisable the findings are (11). Additionally, not stating the expected minimum clinically effective dose and if it has been delivered and received makes it difficult to interpret RCT results. If trial results are non-significant and fidelity of treatment receipt is not reported, it is unclear if this result is due to a lack of effectiveness or failed implementation of the intervention. Ensuring non-significant effects are due to lack of intervention effectiveness helps to avoid a type ii error, whereby the treatment is deemed not effective when the findings are due to confounding variables, such as poor implementation (14).

To improve the reporting of all types of interventions the Template for Intervention Description and Replication (TIDieR) checklist (15) was developed in 2014. The 12 items explain how interventions should be described in published articles, so that trials with effective interventions can be replicated validly and implemented into standard practice reliably. The intervention details required for non-pharmacological interventions, such as the behavioural and educational components used in complex self-management interventions, are explained. Focusing on dose, Item 8 of the checklist highlights 'when and how much', whereby RCT articles should clearly state the number of sessions in the intervention, their duration and over what time period they are delivered. Also, Items 11 and 12 of the checklist state that the planned, delivered and received doses should be included to ensure both adherence and fidelity can be assessed (outlined in Table 1). No previous, published reviews within the LTC complex self-management literature have reviewed whether dose and fidelity are being reported in this way.

Table 1. Extract from the TIDieR checklist of the relevant item descriptions for this review.

TIDieR Checklist Item	Description
Item 8	When and how much: Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose
Item 11	How well (planned): If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them
Item 12	How well (actual): If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned

This systematic review aimed to identify how complex self-management intervention doses for patients with LTCs are reported in RCTs. We assessed this by evaluating whether what the researchers believe to be the minimum clinically effective dose was stated, how this dose was determined, if the dose received by study participants was stated and how it compared to the expected minimum clinically effective dose (fidelity of treatment receipt). We also aimed to determine if reporting of expected minimum clinically effective dose and treatment dose received improved following the publication of the TIDieR checklist in 2014. Finally, we aimed to identify whether reporting of expected minimum clinically effective dose and treatment dose received differed depending on whether the primary outcome results were statistically significant or not. We hypothesised that reporting of dose would have improved since the publication of the TIDieR checklist and that studies with non-significant primary outcomes may report dose more clearly than studies with a significant outcome in an attempt to explain their results.

Methodology:

Search strategy for systematic review and inclusion and exclusion criteria

The systematic review was conducted in accordance with PRISMA (16) (Supplementary Table 1). MEDLINE, CINAHL, AMED and PsychInfo were systematically searched. The full search strategies were developed in consultation with the UCL Library team and can be found in Supplementary Figure 1. Publications were included if published between January 2008 and June 2020, to identify if there was a trend towards improved reporting of treatment dose from 6 years before to 6 years after the TIDieR checklist was published (2014). An update of the review was conducted, searching the literature between June 2020 and January 2022. The same methodological process was followed.

Inclusion criteria (PICOS)

- Population: populations with long-term conditions (5)
- Intervention: complex self-management support with structured session(s) (containing several interacting components that aim to change patients' behaviour), delivered to patients (7, 8)
- Comparator: any
- Outcome: any
- Study Design: randomised controlled trials

Exclusion criteria

- Does not include human participants
- Not a complex self-management support intervention with structured sessions e.g., exercise or psychotherapy only interventions
- Interventions delivered to carers, health care professionals etc.
- Only published as an abstract
- Ongoing studies

The articles from the database searches were exported into EndNote, duplicates removed, and brief screening completed (e.g., removing systematic reviews). Those remaining were uploaded into Abstrackr (http://abstrackr.cebm.brown.edu/) and the two reviewers (TR and AB) independently screened titles and abstracts against the inclusion criteria, classifying articles as included, excluded and maybe eligible. For the update, Rayyan was used instead of Abstrackr, as the software was more user friendly. Forward and backward citation screening was performed on eligible papers. Identified discrepancies were discussed with ST to reach a final decision for full text data extraction.

Data extraction and analysis

Data was independently extracted by TR and AB onto a Word based proforma designed for the study and any disagreements discussed until consensus was reached.

For all studies we extracted trial authors, country, year of publication, intervention name, intervention description and components, LTC disease area, maximum intervention dose that could be delivered in the context of their study, expected minimum clinically effective dose, any rationale given for this, actual dose received, fidelity of treatment receipt and intervention delivery, and statistical significance of the primary outcome.

Within the articles, reporting of dose was determined by the number and length of sessions available to participants and how many they attended. Minimum expected

clinically effective dose was either explicitly stated or stated as the number of sessions needed to be attended to be considered a 'completer' or to be included in the per protocol analysis. If no detail was provided, then this was recorded as 'not reported'. An example of the data extraction process can be seen in Supplementary Table 2. Due to the subjective interpretation of some data points, we piloted this process to ensure accurate and consistent interpretation. The Items included from the TIDieR checklist are outlined in Table 1.

As this was a review of trial reporting, rather than of trial findings, a formal quality assessment was not undertaken. Simple summary statistics were used to report the percentage of trials reporting the various aspects of dose.

No patients were involved in research project.

Results

In the original search, after database searching and deduplication, 14661 titles and abstracts were screened for data extraction and 124 full-text articles screened for eligibility, of which 82 were included in the synthesis. For the update 2311 titles and abstracts were screened, 35 were full-text screened, with 12 papers included. See Figure 1 PRISMA flow diagram.

Characteristics of included RCTs

The population and intervention characteristics varied among the RCTs included. With 27 different LTCs investigated across the 94 articles, including diabetes, cancer survivors, COPD, dementia, arthritis, stroke, serious mental illness and HIV. The complex self-management interventions investigated included Chronic Disease Self-

Management Program (CDSMP (17)), Arthritis Self-Management Program (ASMP (18)), health education programs (19-21), health education combined with exercise programs (22-24), Cognitive Behavioural Approaches (25, 26), and problem-solving and goal setting (27-29). The number of sessions for the intervention ranged from 2 to over 30. A summary of the LTCs, self-management interventions and number of sessions are presented in Tables 2, 3 and 4, respectively. Further details of all included articles are supplied in Supplementary Table 3, with the full reference list of included trials in Supplementary Figure 2.

Table 2. LTCs investigated in the 94 articles included in the systematic review.

Long Term Conditions Investigated	Number of Trials (%)
Type 1 and/or 2 Diabetes	25 (27%)
Fibromyalgia	2 (2%)
Epilepsy	2 (2%)
Chronic Hepatitis C	1 (1%)
Cancer Survivorship	4 (4%)
Dementia/Neurocognitive disorder	2 (2%)
Hypertension	3 (3%)
Arthritis	11 (11%)
HIV	2 (2%)
Spinal Cord Injury	3 (3%)
COPD	4 (4%)
Amputation	2 (2%)
Stroke	8 (9%)
Multiple Sclerosis	1 (1%)
Psychosis	3 (3%)
Serious Mental Illness	3 (3%)
Heart Failure	3 (3%)
Asthma	2 (2%)
Myocardial Infarction	2 (2%)
Generic Chronic Somatic Disease	1 (1%)
Depression	1 (1%)
Chronic Kidney Disease	2 (2%)
Chronic Fatigue Syndrome	1 (1%)
Coronary Heart Disease	1 (1%)
Skin Picking	1 (1%)
Chronic Pain	2 (2%)
Multimorbidity	2 (2%)
Total	94 (100%)

Table 3. Complex self-management interventions in the 94 trials included in the systematic review.

Complex Self-Management Intervention	Number of Trials (%)
Chronic Disease Self-Management Program	9 (10%)
Health Education	32 (35%)
Health Education Combined with Exercise	14 (15%)
Cognitive and Behaviour Change Approach	10 (11%)
Problem Solving and Goal Setting	16 (17%)
Arthritis Self-Management Program	3 (3%)
Other	10 (11%)
Total	94 (100%)

Table 4. Number of sessions delivered in the 94 trials included in the systematic review.

Number of Sessions	Number of Trials (%)
1	0
2-6	44 (48%)
7-12	34 (37%)
>12	15 (16%)
Unclear	1 (1%)
Total	94 (100%)

Reporting of Dose

Of the 94 trials included, 90 (97.8%) reported the maximum number of sessions that could be delivered, 72 (78.3%) reported the length of these sessions and 28 (30.4%) reported the expected minimum clinically effective dose. Of the 28 reporting the expected minimum clinically effective dose, 12 (42.9%) justified how this had been determined. In addition, 62 (67.4%) reported what dose participants received and 48 (52.2%) discussed if this was equal to, or greater than, that scheduled to be delivered in the protocol (fidelity of treatment receipt). It was unclear in 44 articles (47.8%) whether the expected minimum clinically effective dose had been received by participants, as no detail was provided. Of the 48 studies where this information was present, in 36 (75.0%) participants received the expected minimum clinically effective dose, which for 11 of these (22.9%) was also the maximum dose available.

No improvement in reporting of dose since the publication of the TIDieR checklist was observed. Of the 31 articles published between 2008 and 2014 and the 63 published between 2015 and 2022, 6 (19.4%) and 22 (34.9%), respectively, reported the expected minimum clinically effective dose. Of the 31 articles published between 2008 and 2014 and the 63 published between 2015 and 2022, 22 (71.0%) and 40 (63.5%), respectively, reported the number of sessions received and 15 (48.4%) and 28 (44.4%), respectively, reported the length of sessions received. The percentage of trials reporting the expected minimum clinically effective dose, as number of sessions, and the treatment dose participants received per year are represented in Figure 2.

Reporting of the expected minimum clinically effective dose, or the dose received did improve based on the statistical significance of the trial's primary outcome. Of the 55 articles with a significant primary outcome result and the 39 with a non-significant primary outcome result, 12 (21.8%) and 16 (41.0%), respectively, reported the expected minimum clinically effective dose. Of the 55 articles with a significant primary outcome result and the 39 with a non-significant primary outcome result, 31 (56.4%) and 31 (79.5%), respectively, reported the dose received.

Discussion

The included trials covered a variety of LTCs and self-management interventions. As expected, almost all the trials included in this systematic review reported the maximum number of sessions and just over three quarters reported the length of sessions of the complex self-management intervention. Less than a third reported

the expected minimum clinically effective dose and, when this was reported, less than half explained how this had been determined. Just over two thirds reported the number of sessions dose and under half reported length of sessions dose participants received and within these even fewer discussed whether there was fidelity of treatment receipt, i.e., if the dose received was equal to or greater than that specified in the protocol. Improvements in the reporting of the expected minimum clinically effective dose or the dose received were not seen after the TIDieR checklist was published in 2014. However, there was an improvement in the reporting of these doses depending on whether the primary outcome was statistically significant or not, with those with non-significant results reporting the expected minimum clinically effective dose and dose received more often than those with statistically significant differences.

Results in Context

In RCTs of complex self-management interventions in patients with LTCs it is often difficult for the maximum dose to be received by all participants, due to the complexity of both the participants' disease and the intervention itself. However, the number of sessions attended and amount of contact with the intervention leader(s) is often associated with improved patient outcomes (20, 30). It is well documented that receiving 4 of the 6 sessions available in CDSMP results in a beneficial clinical effect (31). Of the 8 papers investigating CDSMP in this review, 4 papers discussed this minimum clinically effective dose and only 2 stated it (32, 33). If no minimum clinically effective dose is stated, interpreting whether the dose participants received was greater than, or equal to, the minimum dose needed to see an improvement (fidelity of treatment receipt) is almost impossible, unless all participants receive the

maximum dose available, which is uncommon (14). If the minimum clinically effective dose is stated and received by participants, then a negative result might be interpreted as an ineffective intervention. If the dose is not received then a negative result could be due to poor implementation of the intervention, rather than a lack of effectiveness. Therefore, by not reporting the dose received, potentially effective interventions could be abandoned, due to the results not being able to be interpreted in relation to the dose received, resulting in a type ii error (14, 34).

If the dose received is stated and is low, further investigation can be done by trial authors or other researchers to determine how it relates to patient outcomes i.e., due to poor trial and/or intervention design. Collecting this information and reporting it enables those implementing the intervention to know what and how much needs to be received to ensure the best outcomes. In the Ackerman et al. trial (35), 27% of those approached to participate declined, as they could not attend all 6 ASMP sessions, and of those who were recruited many did not attend. Adaptations were made to avoid this, such as booking venues close to participants' homes and scheduling on varying days and times. As the authors provided this detail, future researchers are aware of these potential challenges and, in their trials, could adapt the intervention to be delivered another way i.e., home-based, via telephone or web-based to make it more accessible and improve recruitment and retention. Also, if policymakers have this information when designing guidelines and making recommendations for scaling up interventions into standard care, effects seen in trials are more likely to be translated into routine care (36-38).

In addition, researchers must take the time within the early developmental phases of an intervention to ensure the expected minimum clinically effective dose is estimated as accurately as possible, through pilot studies, systematic reviews and/or longitudinal research (10). Although difficult, this focus on early development would prevent fully funded RCTs going ahead when the minimum clinically effective dose has not been determined or measured.

Even when fidelity is mentioned within trial papers, the focus is often on how it was assessed rather than the actual findings, limiting the use of fidelity data to interpret the trial findings, and making the fidelity assessment almost useless (39-41). Understanding the reasons why fidelity is poorly reported is complex, but it is thought to be attributed to lack of knowledge and the practicalities of comprehensively assessing fidelity within an RCT (42). Despite the extra resources needed to conduct a full assessment of fidelity, the economic and scientific costs of not completing and reporting fidelity outcomes are far greater (14). Variations in intervention delivery within trials may influence efficacy and result in biased conclusions.

Although the TIDieR checklist was designed to improve reporting of interventions, no improvement in the reporting of the expected minimal clinically effective dose and dose received was found in this review. Also, within the articles, there was little to no mention of the TIDieR checklist and reporting of interventions in accordance with it, in line with other systematic reviews. investigating implementation in the cardiovascular medicine literature, Palmer et al. (2020) (43) found over one fifth failed to report the dose of the treatment received (Item 11). Within behaviour change research similar results to this review have been found (44), with the

maximum dose available always reported, but other elements of dose poorly described.

An improvement in reporting of dose was seen in studies reporting non-significant results. It is possible that, due to publication bias, reporting standards of studies that are published with non-significant results are of higher quality than studies with significant results.

An alternate explanation is that researchers may be less familiar with the TIDieR checklist, due to the dissemination being less extensive than other reporting guidelines e.g., CONSORT and PRISMA (43). Therefore, broader dissemination of the TIDieR checklist or incorporating the checklist within Item 5 of the CONSORT statement, could improve reporting, as the information would be required by journals for publication (43). Poor implementation of the TIDieR checklist could also be due to the guidelines being too broad and generic and difficult for authors to adapt to their own interventions (45). Making the TIDieR checklist clearer and developing customised versions for specific intervention types could increase implementation of the checklist guidelines and ultimately improve intervention description and reporting (46).

Limitations

The subjective nature of determining the eligibility of trials based on whether the intervention was a complex self-management intervention, could have introduced bias. All those marked potentially eligible were discussed by the study team to limit any potential bias and if there were any doubts the paper was included for data

extraction. If consensus on eligibility could not be met, the paper was sent to a third reviewer (ST), with extensive experience in self-management support interventions for a final decision. Through these discussions decisions around eligibility for inclusion were as consistent as possible given the flexible and varied definition of complex self-management interventions within the literature.

Also, a formal quality assessment was not completed, as we were not looking at the outcome measures. It could be of interest to compare the quality of study with the accuracy of dose reporting, but this was not within the scope and capacity of this review.

Future Research

Following this review, reporting standards of complex self-management intervention doses do not appear to have improved since the publication of the TIDieR checklist. Ensuring that guidelines provide recommendations for how to define and assess dose within complex self-management interventions is vital for accurate reporting and so, interpretation and implementation of trial results. Therefore, either the TIDieR checklist should be updated or novel, specialised methodological guidelines developed to ensure that dose in these trials is determined, measured and reported as accurately as possible. Additionally, looking at whether quality of study correlates to quality of reporting dose could be completed.

Conclusion

Reporting of the minimum clinically effective dose, the dose received in the trial and the fidelity of treatment receipt are not consistent in studies of complex self-

management interventions for LTCs. Although this detail is outlined in the TIDieR checklist, published in 2014, there has been no improvement in reporting following its publication. Currently we recommend that when publishing RCTs, researchers should describe the intervention dose according to the TIDieR checklist. This will enable clinicians and policymakers to reliably replicate the interventions in future trials and/or interpret findings to implement them into practice. Going forward, the TIDieR checklist could be made clearer with versions for specific intervention types and wider dissemination of the checklist to increase implementation of the guidelines and improve intervention reporting. To facilitate this, funders, reviewers and journal editors should encourage dose and fidelity of treatment receipt to be collected and discussed, to increase reporting in this way.

Abbreviations

RCT: Randomised controlled trial; LTC: Long-term condition; TIDieR: Template for intervention description and replication; CDSMP: Chronic disease self-management program; ASMP: Arthritis self-management program

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Ethical Approval Statement

Not applicable

Competing interests

The authors declare that they have no competing interests

Data sharing

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Author contributions

TR, supervised by ST and RT, designed the review and conducted the searches, data extraction, and analysis. TR and AB undertook double screening and data extraction. The authors read and approved the final manuscript.

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Figure legends

Figure 1. PRISMA Systematic Review Flow Diagram

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

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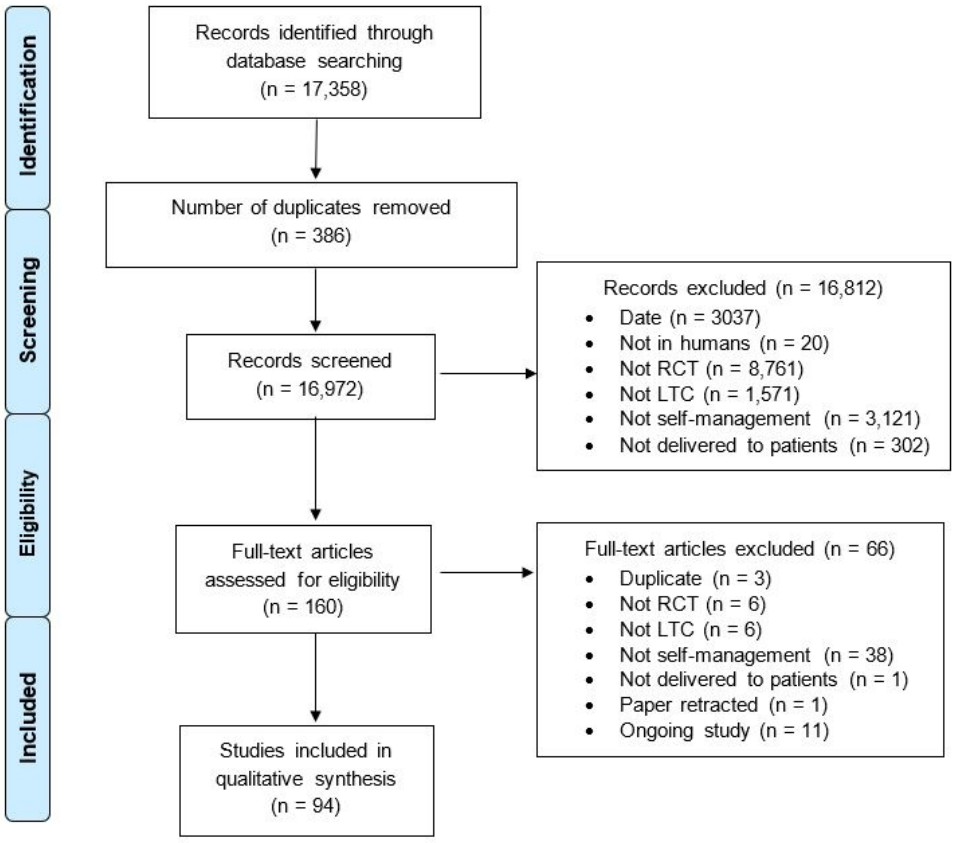

Figure 1. PRISMA Systematic Review Flow Diagram

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131x121mm (144 x 144 DPI)

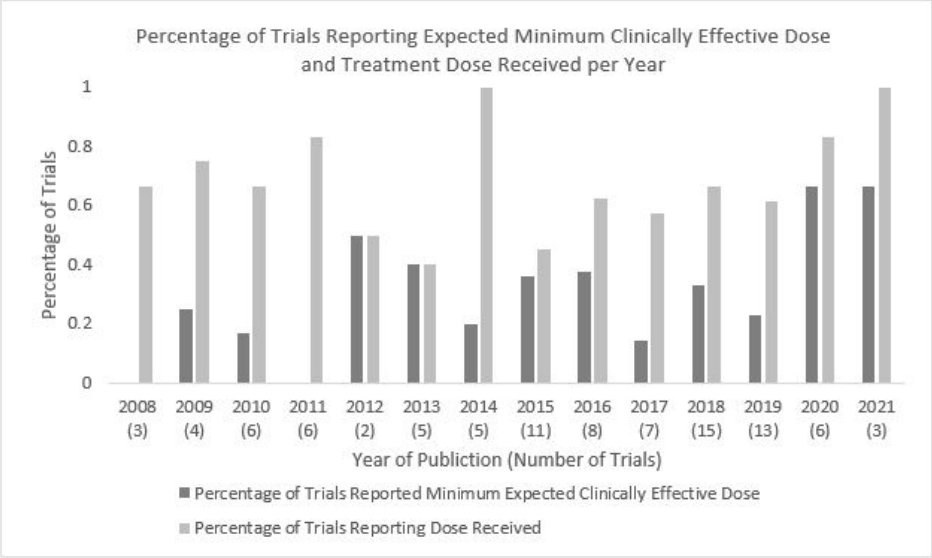

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

118x80mm (144 x 144 DPI)

Supplementary Figure 1. Medline, AMED, PsychINFO and CINAHL Full Search Strategies.

Medline Search Strategy

1. (Long term adj3 condition*).mp.
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. exp cardiovascular diseases/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. exp lung diseases obstructive/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. exp emphysema/
12. exp pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. exp nervous system diseases/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal diseases/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. exp nutrition disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. exp rheumatic diseases/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. exp thyroid diseases/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp hiv infections/

43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp behavio?ral symptoms/
46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction/
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. randomized controlled trial/ or pragmatic clinical trial/
68. randomi?ed controlled trial.mp.
69. controlled clinical trial/
70. randomized controlled trial/
71. double-blind method/ or random allocation/ or single-blind method/
72. Clinical Trials as Topic/
73. placebo.mp.
74. randomi?ed.mp.
75. Drug Therapy/
76. drug therapy.mp.
77. randomly.mp.
78. clinical trial/
79. trial.mp.
80. groups.mp.

81. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80
82. exp animals/ not humans.sh.
83. (#81 not #82).mp.
84. 50 and 66 and 83

AMED Search Strategy

1. (Long term adj3 condition*).mp. [mp=abstract, heading words, title]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).mp. [mp=abstract, heading words, title]
4. long term care/
5. long* term care.tw.
6. Cardiovascular disease/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. lung disease/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. emphysema/
12. pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. (brain adj (disease* or damage* or injur*)).tw.
16. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
17. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
18. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
19. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
20. (hearing loss or deaf* or blind*).tw.
21. down* syndrome.tw.
22. cerebral palsy.tw.
23. exp gastrointestinal disease/
24. exp nervous system disease/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. ((renal or kidney) adj (failure* or insufficienc*)).tw.
27. diabetes mellitus/
28. (diabetes or diabetic*).tw.
29. exp nutrition disorders/
30. (underweight or malnutrition or malnourished).tw.
31. exp arthritis/
32. exp rheumatic disease/
33. fibromyalgia.tw.
34. ((back or neck) adj pain).tw.
35. exp thyroid disease/
36. thyroid.tw.
37. exp hypersensitivity/
38. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
39. exp neoplasms/
40. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.

41. exp hiv infections/
42. (hiv infect* or hiv disease*).tw.
43. exp mental disorders/
44. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
45. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
46. (psychos?s or psychotic* or paranoi* or schizo* or neuros?s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
47. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
48. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47
49. self efficacy/ or self care/
50. self administration/ or self assessment/ or self concept/
51. patient compliance/ or patient education/ or patient participation/
52. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
53. life style/ or disease management/ or risk reduction behavio?r/
54. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
55. (consumer health information or consumer participation).mp. [mp=abstract, heading words, title]
56. health plan implementation.mp.
57. (self care or self management or self efficacy or self monitor$).tw.
58. ((self or oneself) adj3 care).tw.
59. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
60. (health adj5 (promot$ or educat$ or behav$)).tw.
61. (risk adj3 reduc$ adj3 behav$).tw.
62. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
63. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
64. 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63
65. randomized controlled trial.pt.
66. controlled clinical trial.pt.
67. randomized.ab.
68. placebo.ab.
69. randomly.ab.
70. clinical trials.sh.
71. trial.ti.
72. 65 or 66 or 67 or 68 or 69 or 70 or 71
73. exp animals/ not humans.sh.
74. 72 not 73
75. 48 and 64 and 74

PsychINFO Search Strategy

1. (Long term adj3 condition*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
7. sickle cell.mp.
8. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
9. exp emphysema/
10. exp pulmonary emphysema/
11. emphysema.tw.
12. (cystic fibrosis or respiratory distress).mp.
13. exp nervous system disorders/
14. exp cardiovascular disorders/
15. exp lung disorders/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal disorders/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. eating disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. rheumatoid arthritis/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. thyroid disorders/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp AIDS/ or exp HIV/
43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp Behavior Problems/ or behavio?ral symptoms.mp.

46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction.
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. exp Randomized Controlled Trials/
68. exp Clinical Trials/
69. exp Randomized Controlled Trials/ or exp Randomized Clinical Trials/
70. exp Placebo/
71. exp Drug Therapy/
72. randomly.mp.
73. trial.mp.
74. groups.mp.
75. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74
76. exp animals/ not humans.sh.
77. (#75 not #76).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
78. 50 and 66 and 77

CINAHL Search Strategy

S1. long term condition

S2. chronic
S3. ((persistent or long term or ongoing or degenerative) (disease or ill* or condition or insufficienc* or disorder))
S4. long term care
S5. cardiovascular diseases
S6. (heart disease or heart failure or myocardial ischemia or coronary disease or coronary artery disease or myocardial infarction or hypertension or high blood pressure)
S7. sickle cell
S8. lung diseases, obstructive
S9. (obstructive lung disease or obstructive pulmonary disease or copd or asthma or bronchitis)
S10. down* syndrome
S11. cerebral palsy
S12. emphysema
S13. gastrointestinal disorders
S14. renal insufficiency
S15. ((renal or kidney) failure)
S16. diabetes mellitus
S17. nutrition disorders
S18. arthritis
S19. rheumatic diseases
S20. fibromyalgia
S21. (cystic fibrosis or respiratory distress)
S22. thyroid disease
S23. (hypersensitivity or allergy or anaphylaxis)
S24. (cancer* or oncolog* or neoplasm* or tumo?r*)
S25. (hiv infection or hiv disease or hiv)
S26. mental disorders
S27. ((mental or psychiatric or psychological) (ill* or disorder or disease or distress or disability))
S28. ((personality or dysthymic or anxiety or stress or eating or reactive or behavio?r or perception or impulse control or developmental or attention deficit or hyperactivity or conduct or motor skills or movement or tic) disorder
S29. (psychosis or schizophrenia or neurosis or depression or bipolar or mania or obsessive or compulsive or panic or phobia or anorexia or bulimia or dissociative or autism or Asperger's or Tourette or affective or borderline or suicide or self injury or self harm or adhd)
S30. ((substance or drug or alcohol) abuse or addiction) or alcoholism
S31. self efficacy or self care
S32. nervous system diseases
S33. self administration or self assessment or self concept
S34. patient compliance or patient education or patient participation
S35. consumer health information or consumer participation
S36. attitude to health or health behavio?r or health education or health promotion
S37. disease management or risk reduction behavio?r
S38. health plan implementation
S39. self care or self management or self efficacy
S40. ((patient or consumer or health) (education or participation or behavio?r or compliance or disease management))
S41. (((behavio?r change) or (problem solving) or (goal setting) or (decision making) or coping or motivation) (patient or consumer))
S42. (brain (disease or damage or injury))
S43. MH randomized controlled trials
S44. MH double-blind studies
S45. MH single-blind studies

S46. MH random assignment
S47. MH pretest-posttest design
S48. MH cluster sample
S49. TI (randomised OR randomized)
S50. AB (random*)
S51. TI (trial)
S52. MH (sample size) AND AB (assigned OR allocated OR control)
S53. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease or stroke or epilepsy or seizure)
S54. MH (placebos)
S55. PT (randomized controlled trial)
S56. AB (CONTROL W5 GROUP)
S57. MH (CROSSOVER DESIGN) OR MH (COMPARATIVE STUDIES)
S58. AB (CLUSTER W3 RCT)
S59. S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S54 OR S55 OR S56 OR S57 OR S58
S60. MH ANIMALS+
S61. MH (ANIMAL STUDIES)
S62. TI (ANIMAL MODEL*)
S63. S60 OR S61 OR S62
S64. (neurodegenerative or Huntingdon's or Parkinson's or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease)
S65. MH (HUMAN)
S66. S63 NOT S65
S67. S59 NOT S66
S68. ((communication or learning or speech or vision or hearing or psychomotor) disorder)
S69. (deaf or blind)
S70. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S32 OR S42 OR S53 OR S64 OR S68 OR S69
S71. S31 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41
S72. S67 AND S70 AND S71
S73. S67 AND S70 AND S71

Supplementary Figure 2. Reference list for the 82 eligible articles included in this systematic review.

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Reporting checklist for systematic review (with or without a meta-analysis).

Based on the PRISMA guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMAreporting guidelines, and cite them as:

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews

		Reporting Item	Page Number
Title			
Title	#1	Identify the report as a systematic review	1
Abstract			
Abstract	#2	Report an abstract addressing each item in the PRISMA 2020 for Abstracts checklist	2-3
Introduction			
Background/rationale	#3	Describe the rationale for the review in the context of existing knowledge	4-7
Objectives	#4	Provide an explicit statement of the objective(s) or question(s) the review addresses	7
Methods			

Eligibility criteria	#5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses	8-9
Information sources	#6	Specify all databases, registers, websites, organisations, reference lists, and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted	8
Search strategy	#7	Present the full search strategies for all databases, registers, and websites, including any filters and limits used	Supplementary figure 1
Selection process	#8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and, if applicable, details of automation tools used in the process	9
Data collection process	#9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and, if applicable, details of automation tools used in the process	9 and supplementary table 2
Data items	#10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (for example, for all measures, time points, analyses), and, if not, the methods used to decide which results to collect	10
Study risk of bias assessment	#11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and, if applicable, details of automation tools used in the process	10

Effect measures	#12	Specify for each outcome the effect measure(s) (such as risk ratio, mean difference) used in the synthesis or presentation of results	N/A
Synthesis methods	#13a	Describe the processes used to decide which studies were eligible for each synthesis (such as tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5))	8-9
Synthesis methods	#13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics or data conversions	N/A
Synthesis methods	#13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses	N/A
Synthesis methods	#13d	Describe any methods used to synthesise results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used	9-10
Synthesis methods	#13e	Describe any methods used to explore possible causes of heterogeneity among study results (such as subgroup analysis, meta-regression)	N/A
Synthesis methods	#13f	Describe any sensitivity analyses conducted to assess robustness of the synthesised results	N/A
Reporting bias assessment	#14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases)	N/A
Certainty assessment	#15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome	N/A
Data items	#10b	List and define all other variables for which data were sought (such as participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information	N/A

Results

Study selection	#16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (http://www.prisma-statement.org/PRISMAStatement/FlowDiagram)	10 and figure 1
Study selection	#16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded	N/A
Study characteristics	#17	Cite each included study and present its characteristics	10-12 and Supplementary figure 2 and Supplementary Table 3
Risk of bias in studies	#18	Present assessments of risk of bias for each included study	N/A
Results of individual studies	#19	For all outcomes, present for each study (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (such as confidence/credible interval), ideally using structured tables or plots	N/A
Results of syntheses	#20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies	N/A
Results of syntheses	#20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (such as confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect	N/A
Results of syntheses	#20c	Present results of all investigations of possible causes of heterogeneity among study results	N/A
Results of syntheses	#20d	Present results of all sensitivity analyses conducted	N/A

		to assess the robustness of the synthesised results	
Risk of reporting biases in syntheses	#21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed	N/A
Certainty of evidence	#22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed	N/A
Discussion			
Results in context	#23a	Provide a general interpretation of the results in the context of other evidence	14-17
Limitations of included studies	#23b	Discuss any limitations of the evidence included in the review	17-18
Limitations of the review methods	#23c	Discuss any limitations of the review processes used	17-18
Implications	#23d	Discuss implications of the results for practice, policy, and future research	18
Other information			
Registration and protocol	#24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered	3
Registration and protocol	#24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared	20
Registration and protocol	#24c	Describe and explain any amendments to information provided at registration or in the protocol	N/A
Support	#25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review	19-20
Competing interests	#26	Declare any competing interests of review authors	20
Availability of data, code, and other materials	#27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review	20 and supplementary table 3

Notes:

- 7: supplementary figure 1
- 9: 9 and supplementary table 2
- 16a: 10 and figure 1
- 17: 10-12 and Supplementary figure 2 and Supplementary Table 3
- 27: 20 and supplementary table 3

Study Details:

Study Title	
Reference No.	
Data Extractor	
Year, Author, Country, Link	Year after 2008?: Yes ☐ No ☐ TIDieR checklist (2014): Before ☐ After ☐
Pre-extraction Screening	Needs translating: Yes ☐ No ☐ RCT: Yes ☐ No ☐ Self-management intervention: Yes ☐ No ☐ Participants with LTCs: Yes ☐ No ☐ Ongoing study: Yes ☐ No ☐
Research Question / Aim	

Methods:

Study Design	Participant Characteristics:
	RCT details e.g. clusters, unclear:
	How is the control arm described:
	Number of centres: Single centre ☐ Multi-centre ☐ Unclear ☐
Intervention Summary Features	CDSMP ☐ ASMP ☐ EPP ☐ Other ☐ Specify if known Disease specific ☐ or Generic ☐ LTCs included: Delivered by: Health care professional ☐ Lay person ☐ Other ☐ Specify if known Individual one-to-one sessions: Yes ☐ No ☐ Group sessions: Yes ☐ No ☐ Number in group: Face-to-Face sessions ☐ / Remote sessions ☐

	Location where is the intervention delivered: Inpatient ☐ Outpatient ☐ Community Based ☐ Home ☐ Telephone ☐ Web-based ☐ Unclear ☐ Other ☐ Specify if known Description: Any necessary components for adherence:
Dose of Intervention Adherence and compliance may be used synonymously, but the distinction and data needs to be teased out	Maximum dose: Number of sessions: Session Duration (hours): Total hours: Duration intervention delivered over: Anticipated clinically effective dose: Number of sessions: Session Duration (hours): Total hours: How clinically effective dose decided by authors: Author comments on Adherence (the number of sessions participants attended): Author comments on Compliance (the number of sessions participants need to attend to be including in the analysis):
Fidelity of Intervention	Did the study describe attempts to ensure fidelity of the interventions i.e. what was delivered was what was intended to be delivered: Yes ☐ No☐ Not stated/unclear ☐ If Yes, specify: Comments / Additional details:

Results:

Participants		Number	Age (mean, SD)	SES (add measure used)	Ethnicity (% white)	Gender (% female)
	Intervention: Control: All:					
LTCs details:						
Dose of Intervention	Dose actually delivered: Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over: Dose actually received (specifically for groups): Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over:					

	Was the dose delivered ≥ anticipated clinically effective dose: Yes ☐ No ☐ Unclear ☐ Details: Further author comments on dose:
Fidelity of Intervention	Was there fidelity around the dose in the trial?: Yes ☐ No ☐ Unclear ☐ Was fidelity reported on in?: Yes ☐ No ☐ Unclear Do the authors discuss the impact of fidelity?: Yes ☐ No ☐ Unclear ☐ Further author comments on fidelity:
Primary Outcome Result	Was the Primary Outcome Statistically Significant: Yes ☐ No ☐ Details: Was the Primary Outcome Clinically Significant: Yes ☐ No ☐ Unclear ☐ Details:

Cochrane Risk of Bias Assessment:

1. Selection Bias	Randomisation and Allocation Concealment Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
2. Performance Bias	Blinding of Participants and Clinical staff Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
3. Detection Bias	Blinding of Outcome Assessors Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
4. Attrition Bias	Incomplete Outcome data – for each outcome Outcome: Attrition reported: Yes ☐ No ☐ Exclusions reported: Yes ☐ No ☐ % dropped out: Intervention Group: Control Group: Reasons for LTFU: Intervention Group: Control Group: Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
5. Reporting Bias	Selective Outcome Reporting Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐

6. Other Sources of Bias	Bias due to other problems Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐

Supplementary Table 2. Full details of all 94 articles included in the systematic review

First Author	Year	Country	Intervention	Disease	Delivered by	Location	Maximum dose stated (number of sessions)	Maximum dose stated (length of sessions)	Minimum clinically Effective dose stated	Dose received stated (number of sessions)	Dose stated (length of sessions)	Was dose delivered ≥ minimum clinically effective dose	Was fidelity reported and discussed	Was the primary outcome statistically significant
Ackerman	2012	Australia	ASMP	Hip or Knee Osteoarthritis	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Ambrosino	2008	USA	Coping skills training - learning to deal better with day-to-day problems that arise	Type 1 Diabetes	HCPs	Unclear	Yes	Yes	No	Yes	Yes	Unclear	No	No
Anvar	2018	Iran	ASMP	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Bantum	2014	USA	Surviving and Thriving with Cancer website adapted from CDSMP	Cancer survivors	Lay leaders	Web-based	Yes	No	No	Yes	No	Yes	Yes	Yes
Berg	2019	USA	AWAKE - app based weekly modules with aligned homework, combined with weekly phone calls from a coach to discuss content and homework	Cancer survivorship	Healthcare professional	Web-based and telephone	Yes	No	Yes	Yes	No	Yes	No	No
Berry	2015	USA	Diabetes group visits - an individualized session to review medications and a medical examination and a group session for diabetes self-management education	Diabetes	HCPs	Community based	Yes	No	No	No	No	Unclear	No	Yes
Bersani	2017	Italy	group psychoeducation focused on healthy lifestyle - including sleep, physical activity, diet, voluptuary habits	Mood and Psychotic disorders	HCPs	Outpatient clinic	Yes	Yes	No	No	Yes	Unclear	No	Yes

Bosworth	2008	USA	Tailored behavioural intervention with 9 educational modules	Hypertension	HCPs	Telephone	Yes	No	No	Yes	Yes	Yes	Yes	No
Breedland	2011	The Netherlands	FIT program - physical activity combined with an education program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Brorsson	2019	Sweden	Guided Self-Determination-Young (GSD-Y) a person-centered communication and reflection education model that can be used in educational program	Type 1 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Chamany	2015	USA	Telephone support through problem solving and goal setting	Diabetes	HCPs	Telephone	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Chen	2018	China	Patient-centred self-management empowerment intervention (PCSMEI)	Stroke	HCPs	Inpatient, Outpatient and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Chew	2018	Malaysia	Value-based emotion-focused educational programme (VEMOFIT)	Type 2 Diabetes	HCPs	Other: Health Clinic	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Christiansen	2018	USA	A behaviour change intervention based on social cognitive and control theories of behavior change targeting physical exercise, walking activity, and disease self-management	Dysvascular Amputation (Unilateral TTA)	HCPs	Telephone	Yes	Yes	No	Yes	Yes	Yes	No	No
Cook	2013	USA	Wellness Recovery Action Planning including lectures, individual and group exercises, personal sharing and role modeling, and voluntary homework	Serious Mental Illness	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	Yes

Corado	2018	USA	Active, Linkage, Engagement, Retention and Treatment (ALERT) opics included HIV health literacy, Navigating the Health Care System, Disclosure, Adherence, and Self-Efficacy	HIV	HCPs	Outpatient clinic and Community	Yes	No	No	Yes	No	Unclear	Yes	No
Daryabeygi-Khotbehsara	2021	Iran	Education promoting low-fat food consumption, carb counting and physical activity	Type 2 Diabetes	Healthcare professional	Community Based	Yes	Yes	No	Yes	No	Unclear	No	No
Dash	2015	India	Epilepsy health education program designed for those from a low education background.	Epilepsy	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Detaille	2013	The Netherlands	CDSMP adapted for workers with chronic disease	A diagnosed chronic somatic disease	Lay leaders	Community based	Yes	Yes	Yes	No	No	Unclear	No	Yes
Dinh	2019	Vietnam	Teach-back heart failure self-management intervention individual teach-back before discharge, plus a booklet, a weighing scale, a diary, and a telephone call follow-up at 2 weeks following discharge	Heart failure	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Dziedzic	2013	UK	Looking after your joints programme - Self Management in OA of the Hand (1) joint protection; (2) hand exercises; (3) joint protection and hand exercises combined	Hand Osteoarthritis	HCPs	Outpatient clinic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Ehde	2015	USA	Telephone delivered self-management intervention - cognitive-behavioural and positive psychology strategies for helping participants self-manage pain, depression, and fatigue	Multiple Sclerosis	HCPs	Telephone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Fernandez Guijarro	2019	Spain	Health-promotion programme covering healthy eating, lifestyle changes, physical activity, hydration, tobacco and alcohol consumption, stress reduction, and sleep quality and nurse led physical activity.	Serious Mental Illness	HCPs	Community based	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Ferrone	2019	Canada	Integrated disease management - case management, education, and skills training	COPD	HCPs	GP practice and telephone	Yes	No	No	Yes	No	No	Yes	Yes
Forjuoh	2014	USA	CDSMP and PDA	Type 2 Diabetes	Lay leaders	Clinic and community	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Fukuoka	2019	Japan	Disease management program - nurses worked with the subjects and their to achieve individualized clinical target values and goals through education booklets and journal.	Stroke	HCPs	Unclear	Yes	No	No	No	No	Unclear	No	No
Gallinat	2019	Germany	CBT techniques covering psychoeducation, self-management, supportive monitoring and counselling	Skin Picking	HCPs	Web-based	Yes	No	No	Yes	No	No	No	Yes

Geremia	2019	Brazil	Compact, cost-effective, education program (CEPT1)	Type 1 Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Goldberg	2013	USA	CDSMP adapted for psychiatric settings 'Living Well'	Serious Mental Illness with comorbid chronic medical condition	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	No	Yes	Yes	No	No	Yes
Golshahi	2015	Iran	Hypertension self-management - Group A educated about self-care behaviors through eight sessions, group B and group C educated through four pamphlets or eight SMS.	Hypertension	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Grammatopoulou	2016	Greece	Holistic Intervention - recognise facilitators and barriers faced to develop the necessary behaviors and skills to control their disease	Asthma	HCPs	Outpatient clinic and home	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Groessl	2010	USA	CDSMP adapted for veterans	Chronic Hepatitis C	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Grønning	2012	Norway	Arthritis outpatient Educational Program	Polyarthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Harel-Katz	2020	Israel	Improving participation after stroke self-management developed from CDSMP focused on managing home, community, work and social	Stroke	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Harrington	2010	UK	Exercise and education scheme through exercise, guest speakers, goal-setting and social session	Stroke	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Härter	2016	Germany	Telephone based health coaching intervention, to enhance health behaviour change through MI, goal setting, shared decision making	diabetes type 2, coronary artery disease, hypertension, heart failure, asthma, chronic obstructive pulmonary disease, chronic depression or schizophrenia	Healthcare professional	Telephone	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Heutink	2011	The Netherlands	CONECSI (COping with NEuropathiC Spinal cord Injury pain) comprises educational, cognitive, and behavioural elements targeted at coping with CNSCIP	Spinal cord injury	HCPs	Rehabilitation Centre	Yes	Yes	No	Yes	Yes	Yes	No	No
Hewlett	2011	UK	CBT, problem solving and goal setting for fatigue and well-being self-management	Rheumatoid Arthritis	HCPs	Unclear (Face-to-face)	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Holm	2020	Denmark	GLA:D exercise and education program	Knee Osteoarthritis	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Holt	2019	UK	STEPWISE - Each session covered lifestyle changes to help the participants take control of their weight through problem solving	schizophrenia, schizoaffective disorder or first-episode psychosis	HCPs	Community based and telephone	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Houlihan	2017	USA	My Care My Call - promote skill development and facilitate motivation using consumer-centered goal-setting and coaching, education, resource referral, and support-network building	Spinal cord injury	Lay leaders	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes

House	2018	UK	Standardized supported self-management - goal setting, resources and barriers influencing success in reaching goals, and self-monitoring of goal attainment	Type 2 Diabetes with intellectual disability	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jaipakdee	2015	Thailand	Diabetes self-management support (DSMS) with a computer-assisted instruction	Diabetes	HCPs	Community based	No	Yes	No	No	No	Yes	No	Yes
James	2015	Australia	ENRICH: Exercise and Nutrition Routine Improving Cancer Health	Cancer survivors	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Jiang	2019	China	Self-efficacy-focused structured education programme provided diabetes-related knowledge and DSM skills based on self-efficacy theory	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
John	2013	UK	Cognitve Behavioural Education Programme - challenge their way of thinking, changing maladaptive coping skills, cognitions or emotions to lead to more adaptive changes in behaviour	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Ju	2018	China	Peer support provided with usual education	Diabetes	Lay leaders	Community based	No	No	No	No	No	Unclear	No	Yes
Kasteleyn	2015	The Netherlands	Three home visits by a diabetes nurse to increase self-efficacy and illness perceptions	Type 2 Diabetes and first acute coronary event	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Kessler	2018	France, Germany, Italy, Spain	Adapted Living well with COPD Programme - home monitoring and e-health through telephone/web platform	COPD	HCPs	Home and Telephone and web-based platform	Yes	No	Yes	Yes	No	Yes	Yes	No
Kooijmans	2017	The Netherlands	HABITS intervention - optimizing intentions toward a healthier lifestyle and improving perceived behavioural control	Spinal cord injury	HCPs	Community based and home	Yes	No	No	Yes	No	Yes	Yes	No
Laakkonen	2016	Finland	Self-management group rehabilitation to enhance participants' mastery, self-efficacy, and problem-solving skills and to empower them	Dementia	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Lopez-Lopez	2020	Spain	Physical therapy exercise plus self-management program with education and a problem-based session	COPD	Healthcare professional	Inpatient	Yes	No	No	No	No	Unclear	No	Yes
Luciano	2011	Spain	Psychoeducation Program included information about symptoms, comorbid conditions, potential causes, psychosocial factors, current treatments, exercise, and barriers to behavior change and training for relaxation, pain relief, and stress reduction	Fibromyalgia	HCPs	GP practice	Yes	Yes	No	Yes	Yes	No	No	Yes
Ludman	2016	USA	self-management support service – depression self-management training, recovery coaching, and care coordination	Depression	HCPs and Lay leaders	Community based and telephone	Yes	No	Yes	Yes	No	No	Yes	Yes

Manning	2014	UK	Education, Self-Management, and Upper Extremity Exercise Training in People with Rheumatoid Arthritis [EXTRA] program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	No	Yes	No	Yes
Mansouri	2019	Iran	Oral and Written Education Program	Heart failure	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Markle-Reid	2018	Canada	The program offered up to 3 in-home visits; monthly group wellness sessions; monthly case conferences; and ongoing nurse-led care coordination.	Type 2 Diabetes with 3+ comorbidites	HCPs and Lay leaders	Community based and home	Yes	No	No	Yes	No	Unclear	Yes	No
Marsden	2009	Australia	Community Living After Stroke for Survivors and Carers' (CLASSiC) - each session included a 1-hour physical activity followed by a 1-hour education delivered via presentations, group discussions and group activities	Stroke	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No
Miller	2020	Canada	COMMENCE - chronic pain self-management support with pain science education and exercise	Chronic pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	No	No	No	Yes
Minshall	2020	Australia	Stroke Care Optimal Health Program (SCOHOP) Workbook based psychsocial intervention with education, self-management and reflective exercises	Stroke	Healthcare professional	Outpatient or Home or Telephone	Yes	Yes	No	Yes	Yes	Unclear	No	No

Mohammadpour	2015	Iran	A supportive educational intervention plus follow up telephone calls with information on functions of cardiovascular system, aetiology, management of MI risk factors, adherence to treatment and dietary regimens	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Muchiri	2016	South Africa	Nutrition Education Programme	Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	No
Nguyen	2018	Vietnam	CKD booklet and a handout, one face-to-face session and two brief follow-up sessions.	Chronic Kidney Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
O'Toole	2021	Ireland	OPTIMAL intervention promoting accomplishments, vicarious learning, persuasion, interpretation of emotional states	Multimorbidity	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
P´erez-Escamilla	2015	USA	Culturally tailored diabetes education and counselling treatment group including education, skills, and support in the areas of nutrition, physical activity, blood glucose monitoring, medication adherence, and medical appointments.	Type 2 Diabetes	HCPs	Home	Yes	No	No	No	No	Unclear	Yes	Yes

Pinxsterhuis	2017	Norway	self-management program for coping with their illness and dealing with healthcare professionals and family, developed through educational presentations, the exchange of experiences, modelling of self-management skills, guided mastery practice, and informative feedback.	Chronic fatigue syndrome	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No
Ridsdale	2018	UK	Self-management education for people with poorly controlled epilepsy (SMILE [UK]), based on MOSES	Epilepsy	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Rothschild	2014	USA	Mexican American Trial of Community Health Worker (MATCH) knowledge and skills in diabetes self-management, with opportunities to practice goal setting and self-management.	Type 2 Diabetes	HCPs	Home	Yes	Yes	No	Yes	No	No	Yes	Yes
Sajatovic	2018	USA	TargetEd MAnageMent Intervention [TEAM]	Stroke and TIA	HCPs and Lay leaders	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Unclear	No	Yes
Salyers	2014	USA	Illness management and recovery - Incorporating psychoeducation, cognitive-behavioral approaches, relapse prevention, social skills training, and coping skills training.	Schizophrenia or schizoaffective disorder	HCPs	Community based	Yes	No	No	Yes	No	No	Yes	No
Smeulders	2010	The Netherlands	CDSMP	Congestive Heart Failure	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	No	Unclear	No	No

Spencer	2011	USA	Racial and Ethnic Approaches to Community Health (REACH) Initiative - setting patient specific goals and supporting their progress	Diabetes	HCPs	Outpatient clinic and Home and Telephone	Yes	Yes	No	Yes	Yes	No	No	Yes
Still	2021	USA	TechSupport, integrating technology based components and emotional/empathic components known as positive psychological training	Hypertension	Healthcare professional	Web-based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Stuifbergen	2010	USA	The Lifestyle Counts intervention developed from the Wellness for Women with MS curriculum	Fibromyalgia	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Yes	No	No
Swoboda	2016	USA	Multiple-Goal Intervention - combination of goal setting and decision support coaching	Diabetes	HCPs	Outpatient clinic and Telephone	Yes	No	Yes	Yes	No	No	No	Yes
Taggart	2017	UK	DESMOND-ID (Diabetes and Self-Management for Ongoing and Newly Diagnosed for patients with Type 2 diabetes)	Type 2 Diabetes with intellectual disability	HCPs	Community based	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Thoolen	2009	The Netherlands	Beyond Good Intentions – a 12-week self-management course	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Van der Meer	2009	The Netherlands	Internet based self-management program asthma control monitoring and treatment advice, online and group education, and remote Web communications with a specialized asthma nurse.	Asthma	HCPs	Web-based and Unclear	Yes	Yes	No	Yes	No	Unclear	No	Yes

van Erp	2019	Netherlands	Back on Track education, self-management and goal setting intervention, including cognitive behavioural approaches	Chronic lower back pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Van Rooijen	2010	South Africa	Dietary and physical activity education for ongoing nutrition self-management and physical activity	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	No	No	No	No	Unclear	No	Yes
Vos	2019	The Netherlands	Beyond Good Intentions	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Walker	2011	USA	Telephonic behavioural intervention focused on medication adherence and lifestyle changes through healthy eating and physical activity	Diabetes	HCPs	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes
Walsh	2020	UK	FASA facilitating activity and self-management through problem solving and exercise derived from ESCAPE intervention	Lower limb osteoarthritis and chronic lower back pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Wang	2016	Singapore	The Myocardial Infarction Home-based Self-management Programme (MIHSMP) with Heart Recovery Education Booklet (HREB)	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wang	2018	Singapore	Coronary Heart Disease Self-management Programme (CHDSMP)	Coronary Heart Disease	HCPs	Home and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Webel	2010	USA	Positive Self-Management Program (PSMP)	HIV	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	No

Wegener	2009	USA	Promoting Amputee Life Skills Self-management program	Limb loss	HCPs and Lay leaders	Community based	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Wolf	2017	USA	CDSMP	Stroke	HCPs	Outpatient clinic	Yes	Yes	Yes	No	No	Unclear	No	No
Wu	2017	Australia and Taiwan	T-CDSMP adapted for Taiwanese speaking	Cardiovascular disease and Diabetes	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wu	2018	Taiwan	Innovative self-management intervention a video, trainee manual, participation in the self-efficacy-enhancing program, and telephone interviews	End Stage Renal Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Yip	2008	Hong Kong	ASMP with added goal-directed exercise component	Osteoarthrits	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Young	2016	China	Psycho-education group understanding dementia, coping skills, exercise, diet, mood, own strengths, accepting change, communication, relationships, the future	Major neurocognitive disorder	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Zakrisson	2018	Sweden	Self-management intervention based on Bandura's theory of self-efficacy using techniques such as performance mastery, modelling, interpretation of symptoms, and social persuasion	COPD and Coronary Heart Failure	HCPS	Community based	Yes	Yes	No	Yes	Yes	Unclear	Yes	No
Zhang	2015	USA	Stay Dry program biofeedback pelvic floor muscle exercise plus a support group or telephone contact	Prostate cancer with urinary incontinence	HCPs	Telephone and unclear	Yes	Yes	No	No	No	Unclear	No	Yes

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Reporting dose in complex self-management support interventions for long-term conditions: is it defined by researchers and received by participants? - a systematic review

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Reporting dose in complex self-management support interventions for long-term conditions: is it defined by researchers and received by participants? - a systematic review

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Abstract:

Background: The minimum clinically effective dose, and whether this is received in randomised controlled trials (RCTs) of complex self-management interventions in Long-Term Conditions (LTCs), can be unclear. The Template for Intervention Description and Replication (TIDieR) checklist states that dose should be clearly reported to ensure validity and reliable implementation.

Objectives: To identify whether the expected minimum clinically effective dose, and the dose participants received is reported within research articles and if reporting has improved since the TIDieR checklist was published.

Methods: Four databases were systematically searched (MEDLINE, PsycINFO, AMED and CINAHL) to identify published reports between 2008 and 2022 for RCTs investigating complex self-management interventions in LTCs. Data on reporting of dose was extracted and synthesised from the eligible articles.

Results: 94 articles covering various LTCs including diabetes, stroke and arthritis were included. Most complex interventions involved behaviour change combined with education and/or exercise. The maximum dose was usually reported (n=90; 97.8%), but the expected minimum clinically effective dose and the dose received were reported in only 28 (30.4%) and 62 (67.4%) of articles, respectively. Reporting of the expected minimum clinically effective dose and the dose participants received did not improve following the publication of the TIDieR checklist in 2014.

Conclusions: Interpreting results and implementing effective complex self-management interventions is difficult when researchers' reporting of dose is not in line with guidelines. If trial findings indicate benefit from the intervention, clear reporting of dose ensures reliable implementation to standard care. If the results are non-significant, detailed reporting enables better interpretation of results i.e., differentiating between poor implementation and lack of effectiveness. This ensures quality of interventions and validity and generalisability of trial findings. Therefore, wider adoption of reporting the TIDieR checklist dose aspects is strongly recommended. Alternatively, customised guidelines for reporting dose in complex self-management interventions could be developed.

Registration: Prospero ID CRD42020180988

Keywords: dose; reporting; complex self-management intervention; long-term condition; systematic review; TIDieR checklist; fidelity

Strengths and limitations of this study:

- This is the first systematic review to explore whether dose is being reported as the guidelines recommend in randomised trials of self-management interventions.
- Double screening and data extraction was completed, following piloting, ensuring all eligible papers were included and accurate data extracted.
- Determining complex self-management study eligibility was challenging, but we developed a systematic approach to limit potential bias.
- Quality assessment of eligible papers was not conducted, but it could have been interesting to see if quality of study correlated with quality of reporting.

Background:

It is estimated that 30% of the UK population live with a Long-Term Condition (LTC) and that LTCs account for 70% of health and social care spending within the NHS (1). This prevalence extends globally, where LTCs are the leading cause of ill health and result in 70 percent of all deaths (2), with a growing awareness of the importance of monitoring prevalence and developing interventions to overcome LTCs, due to the aging population, predicted increase in LTCs and the associated costs (3, 4). Therefore, the management of LTCs is a priority for the NHS. LTCs are defined as “diseases of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors" (5). The current evidence base suggests LTC treatment should focus on supporting effective self-management to result in better health outcomes (6). Self-management here is defined in conjunction with the US Institute of Medicine definition, echoed by the Department of Health; “Self-management is defined as the tasks that individuals must undertake to live with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their conditions.” (7, 8).

Complex self-management interventions are known to improve a variety of health outcomes in LTCs, including self-efficacy (confidence in ability to execute specific behaviours), patient activation (confidence, skills and knowledge to manage their own health care), self-rated health, clinical outcomes and social outcomes (9). Complex self-management interventions contain several interacting components that aim to change patients’ behaviour. However, determining which parts of the complex intervention are necessary to result in a potential benefit can be difficult. Therefore,

complex self-management interventions should go through stages of development before being evaluated, typically in randomised control trials (RCTs), to identify how much of which components result in the best outcomes (10). Once decided upon, at least the expected minimum clinically effective dose of the complex self-management intervention should be compared to standard care for the LTC to see if health outcomes improve. However, in published reports of RCTs it is often unclear how the minimum clinically effective dose of the intervention was determined or, indeed, what the researchers believe the expected minimally clinically effective dose to be.

The concept of dose refers to the number of intended units of each intervention (dose delivered) and the extent of engagement of participants with the intervention (dose received) (11). Treatment fidelity refers to the extent to which the intervention is delivered as expected, how much of the intervention is received and the amount of treatment enactment of the intervention by participants. Focussing on fidelity of treatment receipt, if the number and length of sessions received is in line with that stated in the protocol, it is essential researchers determine what they think the minimum clinically effective dose is and measure if it is received by participants within the trial, so fidelity of treatment receipt can be assessed (12, 13). This is determined through discussions between those involved in the development of the intervention, to decide what they expect the minimum number of sessions attended are needed to result in a meaningful change. There are two possible explanations for why this information is not reported, either researchers are not having these conversations during intervention development, or they are not reporting what this should be in their methods and papers. Collecting and reporting this information

ensures the quality and integrity of the intervention and enables assessment of how valid and generalisable the findings are (11). Additionally, not stating the expected minimum clinically effective dose and if it has been delivered and received makes it difficult to interpret RCT results. If trial results are non-significant and fidelity of treatment receipt is not reported, it is unclear if this result is due to a lack of effectiveness or failed implementation of the intervention. Ensuring non-significant effects are due to lack of intervention effectiveness helps to avoid a type ii error, whereby the treatment is deemed not effective when the findings are due to confounding variables, such as poor implementation (14).

To improve the reporting of all types of interventions the Template for Intervention Description and Replication (TIDieR) checklist (15) was developed in 2014. The 12 items explain how interventions should be described in published articles, so that trials with effective interventions can be replicated validly and implemented into standard practice reliably. The intervention details required for non-pharmacological interventions, such as the behavioural and educational components used in complex self-management interventions, are explained. Focusing on dose, Item 8 of the checklist highlights 'when and how much', whereby RCT articles should clearly state the number of sessions in the intervention, their duration and over what time period they are delivered. Also, Items 11 and 12 of the checklist state that the planned, delivered and received doses should be included to ensure both adherence and fidelity can be assessed (outlined in Table 1). No previous, published reviews within the LTC complex self-management literature have reviewed whether dose and fidelity are being reported in this way.

Table 1. Extract from the TIDieR checklist of the relevant item descriptions for this review.

TIDieR Checklist Item	Description
Item 8	When and how much: Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose
Item 11	How well (planned): If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them
Item 12	How well (actual): If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned

This systematic review aimed to identify how complex self-management intervention doses for patients with LTCs are reported in RCTs. We assessed this by evaluating whether what the researchers believe to be the minimum clinically effective dose was stated, how this dose was determined, if the dose received by study participants was stated and how it compared to the expected minimum clinically effective dose (fidelity of treatment receipt). We also aimed to determine if reporting of expected minimum clinically effective dose and treatment dose received improved following the publication of the TIDieR checklist in 2014. Finally, we aimed to identify whether reporting of expected minimum clinically effective dose and treatment dose received differed depending on whether the primary outcome results were statistically significant or not. We hypothesised that reporting of dose would have improved since the publication of the TIDieR checklist and that studies with non-significant primary outcomes may report dose more clearly than studies with a significant outcome in an attempt to explain their results.

Methods:

Search strategy for systematic review and inclusion and exclusion criteria

The systematic review was conducted in accordance with PRISMA (16) (Supplementary Table 1). MEDLINE, CINAHL, AMED and PsychInfo were systematically searched. The full search strategies were developed in consultation with the UCL Library team and can be found in Supplementary Figure 1. Publications were included if published between January 2008 and June 2020, to identify if there was a trend towards improved reporting of treatment dose from 6 years before to 6 years after the TIDieR checklist was published (2014). An update of the review was conducted, searching the literature between June 2020 and January 2022. The same methodological process was followed.

Inclusion criteria (PICOS)

- Population: populations with long-term conditions (5)
- Intervention: complex self-management support with structured session(s) (containing several interacting components that aim to change patients' behaviour), delivered to patients (7, 8)
- Comparator: any
- Outcome: any
- Study Design: randomised controlled trials

Exclusion criteria

- Does not include human participants
- Not a complex self-management support intervention with structured sessions e.g., exercise or psychotherapy only interventions
- Interventions delivered to carers, health care professionals etc.
- Only published as an abstract
- Ongoing studies

The articles from the database searches were exported into EndNote, duplicates removed, and brief screening completed (e.g., removing systematic reviews). Those remaining were uploaded into Abstrackr (http://abstrackr.cebm.brown.edu/) and the two reviewers (TR and AB) independently screened titles and abstracts against the inclusion criteria, classifying articles as included, excluded and maybe eligible. For the update, Rayyan was used instead of Abstrackr, as the software was more user friendly. Forward and backward citation screening was performed on eligible papers. Identified discrepancies were discussed with ST to reach a final decision for full text data extraction.

Data extraction and analysis

Data was independently extracted by TR and AB onto a Word based proforma designed for the study and any disagreements discussed until consensus was reached.

For all studies we extracted trial authors, country, year of publication, intervention name, intervention description and components, LTC disease area, maximum intervention dose that could be delivered in the context of their study, expected minimum clinically effective dose, any rationale given for this, actual dose received, fidelity of treatment receipt and intervention delivery, and statistical significance of the primary outcome.

Within the articles, reporting of dose was determined by the number and length of sessions available to participants and how many they attended. Minimum expected

clinically effective dose was either explicitly stated or stated as the number of sessions needed to be attended to be considered a 'completer' or to be included in the per protocol analysis. If no detail was provided, then this was recorded as 'not reported'. An example of the data extraction process can be seen in Supplementary Table 2. Due to the subjective interpretation of some data points, we piloted this process to ensure accurate and consistent interpretation. The Items included from the TIDieR checklist are outlined in Table 1.

As this was a review of trial reporting, rather than of trial findings, a formal quality assessment was not undertaken. Simple summary statistics were used to report the percentage of trials reporting the various aspects of dose.

No patients were involved in research project.

Results

In the original search, after database searching and deduplication, 14661 titles and abstracts were screened for data extraction and 124 full-text articles screened for eligibility, of which 82 were included in the synthesis. For the update 2311 titles and abstracts were screened, 35 were full-text screened, with 12 papers included. See Figure 1 PRISMA flow diagram.

Characteristics of included RCTs

The population and intervention characteristics varied among the RCTs included. With 27 different LTCs investigated across the 94 articles, including diabetes, cancer survivors, COPD, dementia, arthritis, stroke, serious mental illness and HIV. The complex self-management interventions investigated included Chronic Disease Self-

Management Program (CDSMP (17)), Arthritis Self-Management Program (ASMP (18)), health education programs (19-21), health education combined with exercise programs (22-24), Cognitive Behavioural Approaches (25, 26), and problem-solving and goal setting (27-29). The number of sessions for the intervention ranged from 2 to over 30. A summary of the LTCs, self-management interventions and number of sessions are presented in Tables 2, 3 and 4, respectively. Further details of all included articles are supplied in Supplementary Table 3, with the full reference list of included trials in Supplementary Figure 2.

Table 2. LTCs investigated in the 94 articles included in the systematic review.

Long Term Conditions Investigated	Number of Trials (%)
Type 1 and/or 2 Diabetes	25 (27%)
Fibromyalgia	2 (2%)
Epilepsy	2 (2%)
Chronic Hepatitis C	1 (1%)
Cancer Survivorship	4 (4%)
Dementia/Neurocognitive disorder	2 (2%)
Hypertension	3 (3%)
Arthritis	11 (11%)
HIV	2 (2%)
Spinal Cord Injury	3 (3%)
COPD	4 (4%)
Amputation	2 (2%)
Stroke	8 (9%)
Multiple Sclerosis	1 (1%)
Psychosis	3 (3%)
Serious Mental Illness	3 (3%)
Heart Failure	3 (3%)
Asthma	2 (2%)
Myocardial Infarction	2 (2%)
Generic Chronic Somatic Disease	1 (1%)
Depression	1 (1%)
Chronic Kidney Disease	2 (2%)
Chronic Fatigue Syndrome	1 (1%)
Coronary Heart Disease	1 (1%)
Skin Picking	1 (1%)
Chronic Pain	2 (2%)
Multimorbidity	2 (2%)
Total	94 (100%)

Table 3. Complex self-management interventions in the 94 trials included in the systematic review.

Complex Self-Management Intervention	Number of Trials (%)
Chronic Disease Self-Management Program	9 (10%)
Health Education	32 (35%)
Health Education Combined with Exercise	14 (15%)
Cognitive and Behaviour Change Approach	10 (11%)
Problem Solving and Goal Setting	16 (17%)
Arthritis Self-Management Program	3 (3%)
Other	10 (11%)
Total	94 (100%)

Table 4. Number of sessions delivered in the 94 trials included in the systematic review.

Number of Sessions	Number of Trials (%)
1	0
2-6	44 (48%)
7-12	34 (37%)
>12	15 (16%)
Unclear	1 (1%)
Total	94 (100%)

Reporting of Dose

Of the 94 trials included, 90 (97.8%) reported the maximum number of sessions that could be delivered, 72 (78.3%) reported the length of these sessions and 28 (30.4%) reported the expected minimum clinically effective dose. Of the 28 reporting the expected minimum clinically effective dose, 12 (42.9%) justified how this had been determined. In addition, 62 (67.4%) reported what dose participants received and 48 (52.2%) discussed if this was equal to, or greater than, that scheduled to be delivered in the protocol (fidelity of treatment receipt). It was unclear in 44 articles (47.8%) whether the expected minimum clinically effective dose had been received by participants, as no detail was provided. Of the 48 studies where this information was present, in 36 (75.0%) participants received the expected minimum clinically effective dose, which for 11 of these (22.9%) was also the maximum dose available.

No improvement in reporting of dose since the publication of the TIDieR checklist was observed. Of the 31 articles published between 2008 and 2014 and the 63 published between 2015 and 2022, 6 (19.4%) and 22 (34.9%), respectively, reported the expected minimum clinically effective dose. Of the 31 articles published between 2008 and 2014 and the 63 published between 2015 and 2022, 22 (71.0%) and 40 (63.5%), respectively, reported the number of sessions received and 15 (48.4%) and 28 (44.4%), respectively, reported the length of sessions received. The percentage of trials reporting the expected minimum clinically effective dose, as number of sessions, and the treatment dose participants received per year are represented in Figure 2.

Reporting of the expected minimum clinically effective dose, or the dose received did improve based on the statistical significance of the trial's primary outcome. Of the 55 articles with a significant primary outcome result and the 39 with a non-significant primary outcome result, 12 (21.8%) and 16 (41.0%), respectively, reported the expected minimum clinically effective dose. Of the 55 articles with a significant primary outcome result and the 39 with a non-significant primary outcome result, 31 (56.4%) and 31 (79.5%), respectively, reported the dose received.

Discussion

The included trials covered a variety of LTCs and self-management interventions. As expected, almost all the trials included in this systematic review reported the maximum number of sessions and just over three quarters reported the length of sessions of the complex self-management intervention. Less than a third reported

the expected minimum clinically effective dose and, when this was reported, less than half explained how this had been determined. Just over two thirds reported the number of sessions dose and under half reported length of sessions dose participants received and within these even fewer discussed whether there was fidelity of treatment receipt, i.e., if the dose received was equal to or greater than that specified in the protocol. Improvements in the reporting of the expected minimum clinically effective dose or the dose received were not seen after the TIDieR checklist was published in 2014. However, there was an improvement in the reporting of these doses depending on whether the primary outcome was statistically significant or not, with those with non-significant results reporting the expected minimum clinically effective dose and dose received more often than those with statistically significant differences.

Results in Context

In RCTs of complex self-management interventions in patients with LTCs it is often difficult for the maximum dose to be received by all participants, due to the complexity of both the participants' disease and the intervention itself. However, the number of sessions attended and amount of contact with the intervention leader(s) is often associated with improved patient outcomes (20, 30). It is well documented that receiving 4 of the 6 sessions available in CDSMP results in a beneficial clinical effect (31). Of the 9 papers investigating CDSMP in this review, 4 papers discussed this minimum clinically effective dose. If no minimum clinically effective dose is stated, interpreting whether the dose participants received was greater than, or equal to, the minimum dose needed to see an improvement (fidelity of treatment receipt) is almost impossible, unless all participants receive the maximum dose available, which is

uncommon (14). If the minimum clinically effective dose is stated and received by participants, then a negative result might be interpreted as an ineffective intervention. If the dose is not received then a negative result could be due to poor implementation of the intervention, rather than a lack of effectiveness. Therefore, by not reporting the dose received, potentially effective interventions could be abandoned, due to the results not being able to be interpreted in relation to the dose received, resulting in a type ii error (14, 32).

If the dose received is stated and is low, further investigation can be done by trial authors or other researchers to determine how it relates to patient outcomes i.e., due to poor trial and/or intervention design. Collecting this information and reporting it enables those implementing the intervention to know what and how much needs to be received to ensure the best outcomes. In the Ackerman et al. trial (33), 27% of those approached to participate declined, as they could not attend all 6 ASMP sessions, and of those who were recruited many did not attend. Adaptations were made to avoid this, such as booking venues close to participants' homes and scheduling on varying days and times. As the authors provided this detail, future researchers are aware of these potential challenges and, in their trials, could adapt the intervention to be delivered another way i.e., home-based, via telephone or web-based to make it more accessible and improve recruitment and retention. Also, if policymakers have this information when designing guidelines and making recommendations for scaling up interventions into standard care, effects seen in trials are more likely to be translated into routine care (34-36).

In addition, researchers must take the time within the early developmental phases of an intervention to ensure the expected minimum clinically effective dose is estimated as accurately as possible, through pilot studies, systematic reviews and/or longitudinal research (10). Although difficult, this focus on early development would prevent fully funded RCTs going ahead when the minimum clinically effective dose has not been determined or measured.

Even when fidelity is mentioned within trial papers, the focus is often on how it was assessed rather than the actual findings, limiting the use of fidelity data to interpret the trial findings, and making the fidelity assessment almost useless (37-39). Understanding the reasons why fidelity is poorly reported is complex, but it is thought to be attributed to lack of knowledge and the practicalities of comprehensively assessing fidelity within an RCT (40). Despite the extra resources needed to conduct a full assessment of fidelity, the economic and scientific costs of not completing and reporting fidelity outcomes are far greater (14). Variations in intervention delivery within trials may influence efficacy and result in biased conclusions.

Although the TIDieR checklist was designed to improve reporting of interventions, no improvement in the reporting of the expected minimal clinically effective dose and dose received was found in this review. Also, within the articles, there was little to no mention of the TIDieR checklist and reporting of interventions in accordance with it, in line with other systematic reviews. investigating implementation in the cardiovascular medicine literature, Palmer et al. (2020) (41) found over one fifth failed to report the dose of the treatment received (Item 11). Within behaviour change research similar results to this review have been found (42), with the

maximum dose available always reported, but other elements of dose poorly described.

An improvement in reporting of dose was seen in studies reporting non-significant results. It is possible that, due to publication bias, reporting standards of studies that are published with non-significant results are of higher quality than studies with significant results.

An alternate explanation is that researchers may be less familiar with the TIDieR checklist, due to the dissemination being less extensive than other reporting guidelines e.g., CONSORT and PRISMA (41). Therefore, broader dissemination of the TIDieR checklist or incorporating the checklist within Item 5 of the CONSORT statement, could improve reporting, as the information would be required by journals for publication (41). Poor implementation of the TIDieR checklist could also be due to the guidelines being too broad and generic and difficult for authors to adapt to their own interventions (43). Making the TIDieR checklist clearer and developing customised versions for specific intervention types could increase implementation of the checklist guidelines and ultimately improve intervention description and reporting (44).

Limitations

The subjective nature of determining the eligibility of trials based on whether the intervention was a complex self-management intervention, could have introduced bias. All those marked potentially eligible were discussed by the study team to limit any potential bias and if there were any doubts the paper was included for data

extraction. If consensus on eligibility could not be met, the paper was sent to a third reviewer (ST), with extensive experience in self-management support interventions for a final decision. Through these discussions decisions around eligibility for inclusion were as consistent as possible given the flexible and varied definition of complex self-management interventions within the literature.

Also, a formal quality assessment was not completed, as we were not looking at the outcome measures. It could be of interest to compare the quality of study with the accuracy of dose reporting, but this was not within the scope and capacity of this review.

Future Research

Following this review, reporting standards of complex self-management intervention doses do not appear to have improved since the publication of the TIDieR checklist. Ensuring that guidelines provide recommendations for how to define and assess dose within complex self-management interventions is vital for accurate reporting and so, interpretation and implementation of trial results. Therefore, either the TIDieR checklist should be updated or novel, specialised methodological guidelines developed to ensure that dose in these trials is determined, measured, and reported as accurately as possible. Additionally, looking at whether quality of study correlates to quality of reporting dose could be completed.

Conclusion

Reporting of the minimum clinically effective dose, the dose received in the trial and the fidelity of treatment receipt are not consistent in studies of complex self-

management interventions for LTCs. Although this detail is outlined in the TIDieR checklist, published in 2014, there has been no improvement in reporting following its publication. Currently we recommend that when publishing RCTs, researchers should describe the intervention dose according to the TIDieR checklist. This will enable clinicians and policymakers to reliably replicate the interventions in future trials and/or interpret findings to implement them into practice. Going forward, the TIDieR checklist could be made clearer with versions for specific intervention types and wider dissemination of the checklist to increase implementation of the guidelines and improve intervention reporting. To facilitate this, funders, reviewers, and journal editors should encourage dose and fidelity of treatment receipt to be collected and discussed, to increase reporting in this way.

Abbreviations

RCT: Randomised controlled trial; LTC: Long-term condition; TIDieR: Template for intervention description and replication; CDSMP: Chronic disease self-management program; ASMP: Arthritis self-management program

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Ethical Approval Statement

Not applicable

Competing interests

The authors declare that they have no competing interests

Data sharing

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Author contributions

TR, supervised by ST and RT, designed the review and conducted the searches, data extraction, and analysis. TR and AB undertook double screening and data extraction. The authors read and approved the final manuscript.

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Figure legends

Figure 1. PRISMA Systematic Review Flow Diagram

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

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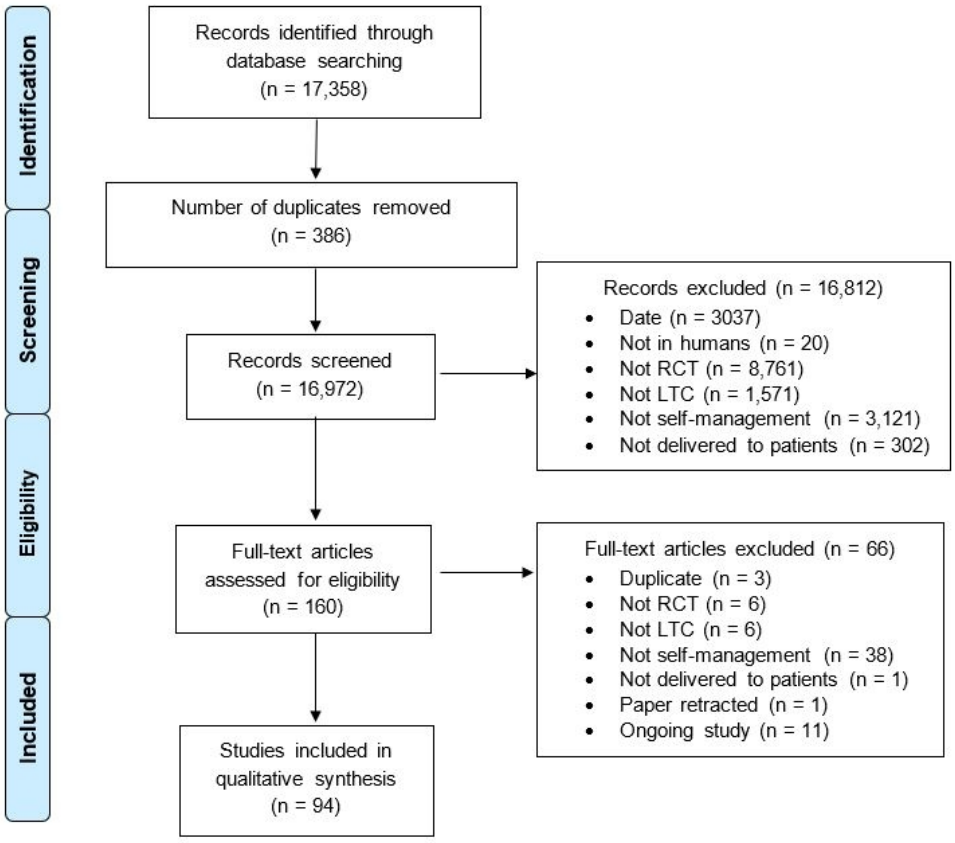

Figure 1. PRISMA Systematic Review Flow Diagram

Figure 1. PRISMA Systematic Review Flow Diagram

131x121mm (144 x 144 DPI)

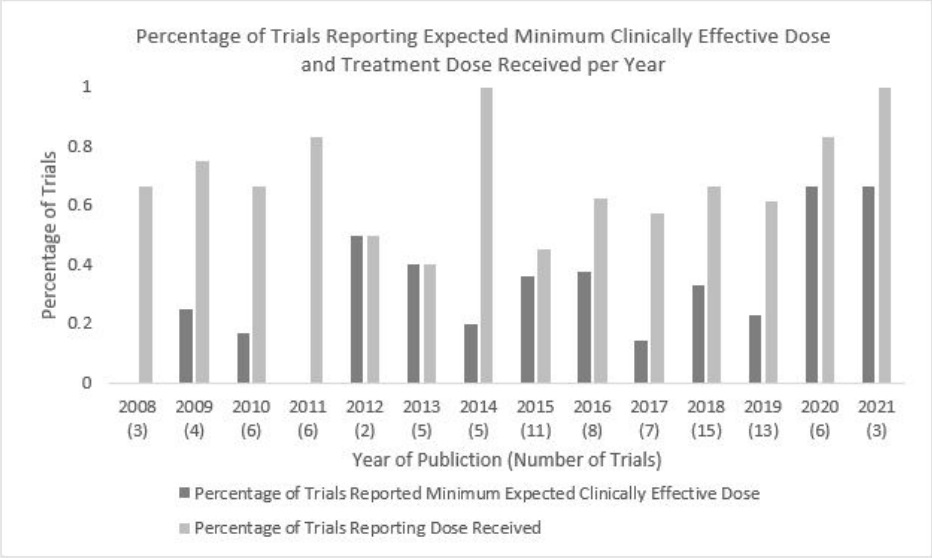

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

Figure 2. Bar graph illustrating the percentage of trials reporting the expected minimum clinically effective dose and the treatment dose received by year.

118x80mm (144 x 144 DPI)

Supplementary Figure 1. Medline, AMED, PsychINFO and CINAHL Full Search Strategies.

Medline Search Strategy

1. (Long term adj3 condition*).mp.
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. exp cardiovascular diseases/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. exp lung diseases obstructive/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. exp emphysema/
12. exp pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. exp nervous system diseases/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal diseases/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. exp nutrition disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. exp rheumatic diseases/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. exp thyroid diseases/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp hiv infections/

43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp behavio?ral symptoms/
46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction/
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. randomized controlled trial/ or pragmatic clinical trial/
68. randomi?ed controlled trial.mp.
69. controlled clinical trial/
70. randomized controlled trial/
71. double-blind method/ or random allocation/ or single-blind method/
72. Clinical Trials as Topic/
73. placebo.mp.
74. randomi?ed.mp.
75. Drug Therapy/
76. drug therapy.mp.
77. randomly.mp.
78. clinical trial/
79. trial.mp.
80. groups.mp.

81. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80
82. exp animals/ not humans.sh.
83. (#81 not #82).mp.
84. 50 and 66 and 83

AMED Search Strategy

1. (Long term adj3 condition*).mp. [mp=abstract, heading words, title]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).mp. [mp=abstract, heading words, title]
4. long term care/
5. long* term care.tw.
6. Cardiovascular disease/
7. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
8. sickle cell.mp.
9. lung disease/
10. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
11. emphysema/
12. pulmonary emphysema/
13. emphysema.tw.
14. (cystic fibrosis or respiratory distress).mp.
15. (brain adj (disease* or damage* or injur*)).tw.
16. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
17. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
18. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
19. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
20. (hearing loss or deaf* or blind*).tw.
21. down* syndrome.tw.
22. cerebral palsy.tw.
23. exp gastrointestinal disease/
24. exp nervous system disease/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. ((renal or kidney) adj (failure* or insufficienc*)).tw.
27. diabetes mellitus/
28. (diabetes or diabetic*).tw.
29. exp nutrition disorders/
30. (underweight or malnutrition or malnourished).tw.
31. exp arthritis/
32. exp rheumatic disease/
33. fibromyalgia.tw.
34. ((back or neck) adj pain).tw.
35. exp thyroid disease/
36. thyroid.tw.
37. exp hypersensitivity/
38. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
39. exp neoplasms/
40. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.

41. exp hiv infections/
42. (hiv infect* or hiv disease*).tw.
43. exp mental disorders/
44. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
45. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
46. (psychos?s or psychotic* or paranoi* or schizo* or neuros?s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
47. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
48. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47
49. self efficacy/ or self care/
50. self administration/ or self assessment/ or self concept/
51. patient compliance/ or patient education/ or patient participation/
52. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
53. life style/ or disease management/ or risk reduction behavio?r/
54. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
55. (consumer health information or consumer participation).mp. [mp=abstract, heading words, title]
56. health plan implementation.mp.
57. (self care or self management or self efficacy or self monitor$).tw.
58. ((self or oneself) adj3 care).tw.
59. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
60. (health adj5 (promot$ or educat$ or behav$)).tw.
61. (risk adj3 reduc$ adj3 behav$).tw.
62. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
63. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
64. 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63
65. randomized controlled trial.pt.
66. controlled clinical trial.pt.
67. randomized.ab.
68. placebo.ab.
69. randomly.ab.
70. clinical trials.sh.
71. trial.ti.
72. 65 or 66 or 67 or 68 or 69 or 70 or 71
73. exp animals/ not humans.sh.
74. 72 not 73
75. 48 and 64 and 74

PsychINFO Search Strategy

1. (Long term adj3 condition*).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
2. chronic*.mp.
3. ((persistent or long* term or ongoing or degenerative) adj3 (disease* or ill* or condition* or insufficienc* or disorder*)).tw.
4. long term care/
5. long* term care.tw.
6. (heart disease* or heart failure or myocardial ischemia or coronary disease* or coronary artery disease* or myocardial infarction or hypertension or high blood pressure).tw.
7. sickle cell.mp.
8. (obstructive lung disease* or obstructive pulmonary disease* or copd or asthma or bronchitis).tw.
9. exp emphysema/
10. exp pulmonary emphysema/
11. emphysema.tw.
12. (cystic fibrosis or respiratory distress).mp.
13. exp nervous system disorders/
14. exp cardiovascular disorders/
15. exp lung disorders/
16. (brain adj (disease* or damage* or injur*)).tw.
17. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease* or stroke or epilep* or seizure*).tw.
18. (neurodegenerative or Huntingdon* or Parkinson* or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease).tw.
19. (paralys* or quadriplegi* or tetraplegi* or paraplegi* or locked in syndrome).tw.
20. ((communication or learning or consciousness or perpetual or speech or voice or vision or hearing or psychomotor) adj disorder*).tw.
21. (hearing loss or hearing aid* or deaf* or blind* or stutter*).tw.
22. down* syndrome.tw.
23. cerebral palsy.tw.
24. exp gastrointestinal disorders/
25. (gatroenter* or intestinal or bowel or colonic).tw.
26. renal insufficiency/
27. ((renal or kidney) adj (failure* or insufficienc*)).tw.
28. diabetes mellitus/
29. (diabetes or diabetic*).tw.
30. eating disorders/
31. (underweight or malnutrition or malnourished or overweight or obes*).tw.
32. exp arthritis/
33. rheumatoid arthritis/
34. (arthritis or osteoarthritis or rheumati* or fibromyalgia).tw.
35. ((back or neck) adj pain).tw.
36. thyroid disorders/
37. thyroid.tw.
38. exp hypersensitivity/
39. (hypersensitivit* or allerg* or intolerance or anaphyla*).mp.
40. exp neoplasms/
41. (cancer* or oncolog* or neoplasm* or carcinom* or tumo?r* or malignan* or leuk?emia).tw.
42. exp AIDS/ or exp HIV/
43. (hiv infect* or hiv disease*).tw.
44. exp mental disorders/
45. exp Behavior Problems/ or behavio?ral symptoms.mp.

46. ((mental* or psychiatr* or psychological*) adj (ill* or disorder* or disease* or distress* or disab* or problem* or health* or patient* or treatment)).tw.
47. ((personality or mood or dysthymic or cognit* or anxiety or stress or eating or adjustment or reactive or somatoform or conversion or behavio?r or perception or psycho* or impulse control or development* or attention deficit or hyperactivity or conduct or motor skills or movement or tic or substance related) adj disorder*).tw.
48. (psychos#s or psychotic* or paranoi* or schizo* or neuros#s or neurotic* or delusion* or depression or depressive or bipolar or mania or manic or obsessi* or compulsi* or panic or phobic or phobia or anorexia or bulimia or neurastheni* or dissociative or autis* or Asperger* or Tourette or dyslex* or affective or borderline or narcissis* or suicid* or self injur* or self harm or adhd).tw.
49. (((substance or drug or alcohol) adj abuse) or "substance use" or "illegal drug use" or addict* or alcoholism or (problem* adj1 drinking)).tw.
50. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49
51. self efficacy/ or self care/
52. self administration/ or self assessment/ or self concept/
53. patient compliance/ or patient education as topic/ or patient participation/ or patient satisfaction.
54. consumer health information/ or consumer participation/
55. attitude to health/ or health behavio?r/ or health education/ or health knowledge, attitudes, practice/ or health promotion/
56. life style/ or disease management/ or risk reduction behavio?r/
57. adaptation, psychological/ or motivation/ or goals/ or problem solving/ or exp decision making/
58. health plan implementation/
59. (self care or selfcare or self management or selfmanagement or self efficacy or selfefficacy or self monitor$ or selfmonitor$).tw.
60. ((self or oneself) adj3 care).tw.
61. ((patient$ or consumer$ or client$) adj5 (educat$ or participat$ or behavio?r$ or behavio?r$ or compliance or centered)).tw.
62. (health adj5 (promot$ or educat$ or behav$)).tw.
63. (risk adj3 reduc$ adj3 behav$).tw.
64. ((patient$ or consumer$ or client$) adj5 manag$ adj5 disease$).tw.
65. (((behav$ adj3 chang$) or (problem$ adj3 solv$) or (goal$ adj3 setting) or (decision$ adj3 mak$) or coping) adj5 (patient$ or consumer$ or client$)).tw.
66. 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65
67. exp Randomized Controlled Trials/
68. exp Clinical Trials/
69. exp Randomized Controlled Trials/ or exp Randomized Clinical Trials/
70. exp Placebo/
71. exp Drug Therapy/
72. randomly.mp.
73. trial.mp.
74. groups.mp.
75. 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74
76. exp animals/ not humans.sh.
77. (#75 not #76).mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh]
78. 50 and 66 and 77

CINAHL Search Strategy

S1. long term condition

S2. chronic
S3. ((persistent or long term or ongoing or degenerative) (disease or ill* or condition or insufficienc* or disorder))
S4. long term care
S5. cardiovascular diseases
S6. (heart disease or heart failure or myocardial ischemia or coronary disease or coronary artery disease or myocardial infarction or hypertension or high blood pressure)
S7. sickle cell
S8. lung diseases, obstructive
S9. (obstructive lung disease or obstructive pulmonary disease or copd or asthma or bronchitis)
S10. down* syndrome
S11. cerebral palsy
S12. emphysema
S13. gastrointestinal disorders
S14. renal insufficiency
S15. ((renal or kidney) failure)
S16. diabetes mellitus
S17. nutrition disorders
S18. arthritis
S19. rheumatic diseases
S20. fibromyalgia
S21. (cystic fibrosis or respiratory distress)
S22. thyroid disease
S23. (hypersensitivity or allergy or anaphylaxis)
S24. (cancer* or oncolog* or neoplasm* or tumo?r*)
S25. (hiv infection or hiv disease or hiv)
S26. mental disorders
S27. ((mental or psychiatric or psychological) (ill* or disorder or disease or distress or disability))
S28. ((personality or dysthymic or anxiety or stress or eating or reactive or behavio?r or perception or impulse control or developmental or attention deficit or hyperactivity or conduct or motor skills or movement or tic) disorder
S29. (psychosis or schizophrenia or neurosis or depression or bipolar or mania or obsessive or compulsive or panic or phobia or anorexia or bulimia or dissociative or autism or Asperger's or Tourette or affective or borderline or suicide or self injury or self harm or adhd)
S30. ((substance or drug or alcohol) abuse or addiction) or alcoholism
S31. self efficacy or self care
S32. nervous system diseases
S33. self administration or self assessment or self concept
S34. patient compliance or patient education or patient participation
S35. consumer health information or consumer participation
S36. attitude to health or health behavio?r or health education or health promotion
S37. disease management or risk reduction behavio?r
S38. health plan implementation
S39. self care or self management or self efficacy
S40. ((patient or consumer or health) (education or participation or behavio?r or compliance or disease management))
S41. (((behavio?r change) or (problem solving) or (goal setting) or (decision making) or coping or motivation) (patient or consumer))
S42. (brain (disease or damage or injury))
S43. MH randomized controlled trials
S44. MH double-blind studies
S45. MH single-blind studies

S46. MH random assignment
S47. MH pretest-posttest design
S48. MH cluster sample
S49. TI (randomised OR randomized)
S50. AB (random*)
S51. TI (trial)
S52. MH (sample size) AND AB (assigned OR allocated OR control)
S53. (cerebrovascular or brain ischemia or cerebral infarction or carotid artery disease or stroke or epilepsy or seizure)
S54. MH (placebos)
S55. PT (randomized controlled trial)
S56. AB (CONTROL W5 GROUP)
S57. MH (CROSSOVER DESIGN) OR MH (COMPARATIVE STUDIES)
S58. AB (CLUSTER W3 RCT)
S59. S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S54 OR S55 OR S56 OR S57 OR S58
S60. MH ANIMALS+
S61. MH (ANIMAL STUDIES)
S62. TI (ANIMAL MODEL*)
S63. S60 OR S61 OR S62
S64. (neurodegenerative or Huntingdon's or Parkinson's or amyotrophic lateral sclerosis or multiple sclerosis or motor neuron disease)
S65. MH (HUMAN)
S66. S63 NOT S65
S67. S59 NOT S66
S68. ((communication or learning or speech or vision or hearing or psychomotor) disorder)
S69. (deaf or blind)
S70. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S32 OR S42 OR S53 OR S64 OR S68 OR S69
S71. S31 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41
S72. S67 AND S70 AND S71
S73. S67 AND S70 AND S71

Supplementary Figure 2. Reference list for the 82 eligible articles included in this systematic review.

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Reporting checklist for systematic review (with or without a meta-analysis).

Based on the PRISMA guidelines.

Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMAreporting guidelines, and cite them as:

Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews

		Reporting Item	Page Number
Title			
Title	#1	Identify the report as a systematic review	1
Abstract			
Abstract	#2	Report an abstract addressing each item in the PRISMA 2020 for Abstracts checklist	2-3
Introduction			
Background/rationale	#3	Describe the rationale for the review in the context of existing knowledge	4-7
Objectives	#4	Provide an explicit statement of the objective(s) or question(s) the review addresses	7
Methods			

Eligibility criteria	#5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses	8-9
Information sources	#6	Specify all databases, registers, websites, organisations, reference lists, and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted	8
Search strategy	#7	Present the full search strategies for all databases, registers, and websites, including any filters and limits used	Supplementary figure 1
Selection process	#8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and, if applicable, details of automation tools used in the process	9
Data collection process	#9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and, if applicable, details of automation tools used in the process	9 and supplementary table 2
Data items	#10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (for example, for all measures, time points, analyses), and, if not, the methods used to decide which results to collect	10
Study risk of bias assessment	#11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and, if applicable, details of automation tools used in the process	10

Effect measures	#12	Specify for each outcome the effect measure(s) (such as risk ratio, mean difference) used in the synthesis or presentation of results	N/A
Synthesis methods	#13a	Describe the processes used to decide which studies were eligible for each synthesis (such as tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5))	8-9
Synthesis methods	#13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics or data conversions	N/A
Synthesis methods	#13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses	N/A
Synthesis methods	#13d	Describe any methods used to synthesise results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used	9-10
Synthesis methods	#13e	Describe any methods used to explore possible causes of heterogeneity among study results (such as subgroup analysis, meta-regression)	N/A
Synthesis methods	#13f	Describe any sensitivity analyses conducted to assess robustness of the synthesised results	N/A
Reporting bias assessment	#14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases)	N/A
Certainty assessment	#15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome	N/A
Data items	#10b	List and define all other variables for which data were sought (such as participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information	N/A

Results

Study selection	#16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram (http://www.prisma-statement.org/PRISMAStatement/FlowDiagram)	10 and figure 1
Study selection	#16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded	N/A
Study characteristics	#17	Cite each included study and present its characteristics	10-12 and Supplementary figure 2 and Supplementary Table 3
Risk of bias in studies	#18	Present assessments of risk of bias for each included study	N/A
Results of individual studies	#19	For all outcomes, present for each study (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (such as confidence/credible interval), ideally using structured tables or plots	N/A
Results of syntheses	#20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies	N/A
Results of syntheses	#20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (such as confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect	N/A
Results of syntheses	#20c	Present results of all investigations of possible causes of heterogeneity among study results	N/A
Results of syntheses	#20d	Present results of all sensitivity analyses conducted	N/A

		to assess the robustness of the synthesised results	
Risk of reporting biases in syntheses	#21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed	N/A
Certainty of evidence	#22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed	N/A
Discussion			
Results in context	#23a	Provide a general interpretation of the results in the context of other evidence	14-17
Limitations of included studies	#23b	Discuss any limitations of the evidence included in the review	17-18
Limitations of the review methods	#23c	Discuss any limitations of the review processes used	17-18
Implications	#23d	Discuss implications of the results for practice, policy, and future research	18
Other information			
Registration and protocol	#24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered	3
Registration and protocol	#24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared	20
Registration and protocol	#24c	Describe and explain any amendments to information provided at registration or in the protocol	N/A
Support	#25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review	19-20
Competing interests	#26	Declare any competing interests of review authors	20
Availability of data, code, and other materials	#27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review	20 and supplementary table 3

Notes:

- 7: supplementary figure 1
- 9: 9 and supplementary table 2
- 16a: 10 and figure 1
- 17: 10-12 and Supplementary figure 2 and Supplementary Table 3
- 27: 20 and supplementary table 3

Study Details:

Study Title	
Reference No.	
Data Extractor	
Year, Author, Country, Link	Year after 2008?: Yes ☐ No ☐ TIDieR checklist (2014): Before ☐ After ☐
Pre-extraction Screening	Needs translating: Yes ☐ No ☐ RCT: Yes ☐ No ☐ Self-management intervention: Yes ☐ No ☐ Participants with LTCs: Yes ☐ No ☐ Ongoing study: Yes ☐ No ☐
Research Question / Aim	

Methods:

Study Design	Participant Characteristics:
	RCT details e.g. clusters, unclear:
	How is the control arm described:
	Number of centres: Single centre ☐ Multi-centre ☐ Unclear ☐
Intervention Summary Features	CDSMP ☐ ASMP ☐ EPP ☐ Other ☐ Specify if known Disease specific ☐ or Generic ☐ LTCs included: Delivered by: Health care professional ☐ Lay person ☐ Other ☐ Specify if known Individual one-to-one sessions: Yes ☐ No ☐ Group sessions: Yes ☐ No ☐ Number in group: Face-to-Face sessions ☐ / Remote sessions ☐

	Location where is the intervention delivered: Inpatient ☐ Outpatient ☐ Community Based ☐ Home ☐ Telephone ☐ Web-based ☐ Unclear ☐ Other ☐ Specify if known Description: Any necessary components for adherence:
Dose of Intervention Adherence and compliance may be used synonymously, but the distinction and data needs to be teased out	Maximum dose: Number of sessions: Session Duration (hours): Total hours: Duration intervention delivered over: Anticipated clinically effective dose: Number of sessions: Session Duration (hours): Total hours: How clinically effective dose decided by authors: Author comments on Adherence (the number of sessions participants attended): Author comments on Compliance (the number of sessions participants need to attend to be including in the analysis):
Fidelity of Intervention	Did the study describe attempts to ensure fidelity of the interventions i.e. what was delivered was what was intended to be delivered: Yes ☐ No☐ Not stated/unclear ☐ If Yes, specify: Comments / Additional details:

Results:

Participants		Number	Age (mean, SD)	SES (add measure used)	Ethnicity (% white)	Gender (% female)
	Intervention: Control: All:					
LTCs details:						
Dose of Intervention	Dose actually delivered: Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over: Dose actually received (specifically for groups): Number of sessions: Session Duration (hours): Total hours: Duration Intervention Delivered Over:					

	Was the dose delivered ≥ anticipated clinically effective dose: Yes ☐ No ☐ Unclear ☐ Details: Further author comments on dose:
Fidelity of Intervention	Was there fidelity around the dose in the trial?: Yes ☐ No ☐ Unclear ☐ Was fidelity reported on in?: Yes ☐ No ☐ Unclear Do the authors discuss the impact of fidelity?: Yes ☐ No ☐ Unclear ☐ Further author comments on fidelity:
Primary Outcome Result	Was the Primary Outcome Statistically Significant: Yes ☐ No ☐ Details: Was the Primary Outcome Clinically Significant: Yes ☐ No ☐ Unclear ☐ Details:

Cochrane Risk of Bias Assessment:

1. Selection Bias	Randomisation and Allocation Concealment Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
2. Performance Bias	Blinding of Participants and Clinical staff Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
3. Detection Bias	Blinding of Outcome Assessors Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
4. Attrition Bias	Incomplete Outcome data – for each outcome Outcome: Attrition reported: Yes ☐ No ☐ Exclusions reported: Yes ☐ No ☐ % dropped out: Intervention Group: Control Group: Reasons for LTFU: Intervention Group: Control Group: Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐
5. Reporting Bias	Selective Outcome Reporting Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐

6. Other Sources of Bias	Bias due to other problems Your assessment of this bias: 'Low risk' ☐ 'High risk' ☐ 'Unclear risk' ☐

Supplementary Table 2. Full details of all 94 articles included in the systematic review

First Author	Year	Country	Intervention	Disease	Delivered by	Location	Maximum dose stated (number of sessions)	Maximum dose stated (length of sessions)	Minimum clinically Effective dose stated	Dose received stated (number of sessions)	Dose stated (length of sessions)	Was dose delivered ≥ minimum clinically effective dose	Was fidelity reported and discussed	Was the primary outcome statistically significant
Ackerman	2012	Australia	ASMP	Hip or Knee Osteoarthritis	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Ambrosino	2008	USA	Coping skills training - learning to deal better with day-to-day problems that arise	Type 1 Diabetes	HCPs	Unclear	Yes	Yes	No	Yes	Yes	Unclear	No	No
Anvar	2018	Iran	ASMP	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Bantum	2014	USA	Surviving and Thriving with Cancer website adapted from CDSMP	Cancer survivors	Lay leaders	Web-based	Yes	No	No	Yes	No	Yes	Yes	Yes
Berg	2019	USA	AWAKE - app based weekly modules with aligned homework, combined with weekly phone calls from a coach to discuss content and homework	Cancer survivorship	Healthcare professional	Web-based and telephone	Yes	No	Yes	Yes	No	Yes	No	No
Berry	2015	USA	Diabetes group visits - an individualized session to review medications and a medical examination and a group session for diabetes self-management education	Diabetes	HCPs	Community based	Yes	No	No	No	No	Unclear	No	Yes
Bersani	2017	Italy	group psychoeducation focused on healthy lifestyle - including sleep, physical activity, diet, voluptuary habits	Mood and Psychotic disorders	HCPs	Outpatient clinic	Yes	Yes	No	No	Yes	Unclear	No	Yes

Bosworth	2008	USA	Tailored behavioural intervention with 9 educational modules	Hypertension	HCPs	Telephone	Yes	No	No	Yes	Yes	Yes	Yes	No
Breedland	2011	The Netherlands	FIT program - physical activity combined with an education program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Brorsson	2019	Sweden	Guided Self-Determination-Young (GSD-Y) a person-centered communication and reflection education model that can be used in educational program	Type 1 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Chamany	2015	USA	Telephone support through problem solving and goal setting	Diabetes	HCPs	Telephone	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Chen	2018	China	Patient-centred self-management empowerment intervention (PCSMEI)	Stroke	HCPs	Inpatient, Outpatient and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Chew	2018	Malaysia	Value-based emotion-focused educational programme (VEMOFIT)	Type 2 Diabetes	HCPs	Other: Health Clinic	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Christiansen	2018	USA	A behaviour change intervention based on social cognitive and control theories of behavior change targeting physical exercise, walking activity, and disease self-management	Dysvascular Amputation (Unilateral TTA)	HCPs	Telephone	Yes	Yes	No	Yes	Yes	Yes	No	No
Cook	2013	USA	Wellness Recovery Action Planning including lectures, individual and group exercises, personal sharing and role modeling, and voluntary homework	Serious Mental Illness	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	Yes

Corado	2018	USA	Active, Linkage, Engagement, Retention and Treatment (ALERT) opics included HIV health literacy, Navigating the Health Care System, Disclosure, Adherence, and Self-Efficacy	HIV	HCPs	Outpatient clinic and Community	Yes	No	No	Yes	No	Unclear	Yes	No
Daryabeygi-Khotbehsara	2021	Iran	Education promoting low-fat food consumption, carb counting and physical activity	Type 2 Diabetes	Healthcare professional	Community Based	Yes	Yes	No	Yes	No	Unclear	No	No
Dash	2015	India	Epilepsy health education program designed for those from a low education background.	Epilepsy	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Detaille	2013	The Netherlands	CDSMP adapted for workers with chronic disease	A diagnosed chronic somatic disease	Lay leaders	Community based	Yes	Yes	Yes	No	No	Unclear	No	Yes
Dinh	2019	Vietnam	Teach-back heart failure self-management intervention individual teach-back before discharge, plus a booklet, a weighing scale, a diary, and a telephone call follow-up at 2 weeks following discharge	Heart failure	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Dziedzic	2013	UK	Looking after your joints programme - Self Management in OA of the Hand (1) joint protection; (2) hand exercises; (3) joint protection and hand exercises combined	Hand Osteoarthritis	HCPs	Outpatient clinic	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Ehde	2015	USA	Telephone delivered self-management intervention - cognitive-behavioural and positive psychology strategies for helping participants self-manage pain, depression, and fatigue	Multiple Sclerosis	HCPs	Telephone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Fernandez Guijarro	2019	Spain	Health-promotion programme covering healthy eating, lifestyle changes, physical activity, hydration, tobacco and alcohol consumption, stress reduction, and sleep quality and nurse led physical activity.	Serious Mental Illness	HCPs	Community based	Yes	Yes	No	Yes	Yes	Unclear	No	Yes
Ferrone	2019	Canada	Integrated disease management - case management, education, and skills training	COPD	HCPs	GP practice and telephone	Yes	No	No	Yes	No	No	Yes	Yes
Forjuoh	2014	USA	CDSMP and PDA	Type 2 Diabetes	Lay leaders	Clinic and community	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Fukuoka	2019	Japan	Disease management program - nurses worked with the subjects and their to achieve individualized clinical target values and goals through education booklets and journal.	Stroke	HCPs	Unclear	Yes	No	No	No	No	Unclear	No	No
Gallinat	2019	Germany	CBT techniques covering psychoeducation, self-management, supportive monitoring and counselling	Skin Picking	HCPs	Web-based	Yes	No	No	Yes	No	No	No	Yes

Geremia	2019	Brazil	Compact, cost-effective, education program (CEPT1)	Type 1 Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Goldberg	2013	USA	CDSMP adapted for psychiatric settings 'Living Well'	Serious Mental Illness with comorbid chronic medical condition	HCPs and Lay leaders	Outpatient clinic and Community	Yes	Yes	No	Yes	Yes	No	No	Yes
Golshahi	2015	Iran	Hypertension self-management - Group A educated about self-care behaviors through eight sessions, group B and group C educated through four pamphlets or eight SMS.	Hypertension	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Grammatopoulou	2016	Greece	Holistic Intervention - recognise facilitators and barriers faced to develop the necessary behaviors and skills to control their disease	Asthma	HCPs	Outpatient clinic and home	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Groessl	2010	USA	CDSMP adapted for veterans	Chronic Hepatitis C	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Grønning	2012	Norway	Arthritis outpatient Educational Program	Polyarthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Harel-Katz	2020	Israel	Improving participation after stroke self-management developed from CDSMP focused on managing home, community, work and social	Stroke	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Harrington	2010	UK	Exercise and education scheme through exercise, guest speakers, goal-setting and social session	Stroke	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes

Härter	2016	Germany	Telephone based health coaching intervention, to enhance health behaviour change through MI, goal setting, shared decision making	diabetes type 2, coronary artery disease, hypertension, heart failure, asthma, chronic obstructive pulmonary disease, chronic depression or schizophrenia	Healthcare professional	Telephone	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Heutink	2011	The Netherlands	CONECSI (COping with NEuropathiC Spinal cord Injury pain) comprises educational, cognitive, and behavioural elements targeted at coping with CNSCIP	Spinal cord injury	HCPs	Rehabilitation Centre	Yes	Yes	No	Yes	Yes	Yes	No	No
Hewlett	2011	UK	CBT, problem solving and goal setting for fatigue and well-being self-management	Rheumatoid Arthritis	HCPs	Unclear (Face-to-face)	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Holm	2020	Denmark	GLA:D exercise and education program	Knee Osteoarthritis	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Holt	2019	UK	STEPWISE - Each session covered lifestyle changes to help the participants take control of their weight through problem solving	schizophrenia, schizoaffective disorder or first-episode psychosis	HCPs	Community based and telephone	Yes	Yes	Yes	Yes	Yes	No	Yes	No
Houlihan	2017	USA	My Care My Call - promote skill development and facilitate motivation using consumer-centered goal-setting and coaching, education, resource referral, and support-network building	Spinal cord injury	Lay leaders	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes

House	2018	UK	Standardized supported self-management - goal setting, resources and barriers influencing success in reaching goals, and self-monitoring of goal attainment	Type 2 Diabetes with intellectual disability	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jaipakdee	2015	Thailand	Diabetes self-management support (DSMS) with a computer-assisted instruction	Diabetes	HCPs	Community based	No	Yes	No	No	No	Yes	No	Yes
James	2015	Australia	ENRICH: Exercise and Nutrition Routine Improving Cancer Health	Cancer survivors	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Jiang	2019	China	Self-efficacy-focused structured education programme provided diabetes-related knowledge and DSM skills based on self-efficacy theory	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
John	2013	UK	Cognitve Behavioural Education Programme - challenge their way of thinking, changing maladaptive coping skills, cognitions or emotions to lead to more adaptive changes in behaviour	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Ju	2018	China	Peer support provided with usual education	Diabetes	Lay leaders	Community based	No	No	No	No	No	Unclear	No	Yes
Kasteleyn	2015	The Netherlands	Three home visits by a diabetes nurse to increase self-efficacy and illness perceptions	Type 2 Diabetes and first acute coronary event	HCPs	Home	Yes	Yes	Yes	Yes	Yes	Yes	No	No

Kessler	2018	France, Germany, Italy, Spain	Adapted Living well with COPD Programme - home monitoring and e-health through telephone/web platform	COPD	HCPs	Home and Telephone and web-based platform	Yes	No	Yes	Yes	No	Yes	Yes	No
Kooijmans	2017	The Netherlands	HABITS intervention - optimizing intentions toward a healthier lifestyle and improving perceived behavioural control	Spinal cord injury	HCPs	Community based and home	Yes	No	No	Yes	No	Yes	Yes	No
Laakkonen	2016	Finland	Self-management group rehabilitation to enhance participants' mastery, self-efficacy, and problem-solving skills and to empower them	Dementia	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Lopez-Lopez	2020	Spain	Physical therapy exercise plus self-management program with education and a problem-based session	COPD	Healthcare professional	Inpatient	Yes	No	No	No	No	Unclear	No	Yes
Luciano	2011	Spain	Psychoeducation Program included information about symptoms, comorbid conditions, potential causes, psychosocial factors, current treatments, exercise, and barriers to behavior change and training for relaxation, pain relief, and stress reduction	Fibromyalgia	HCPs	GP practice	Yes	Yes	No	Yes	Yes	No	No	Yes
Ludman	2016	USA	self-management support service – depression self-management training, recovery coaching, and care coordination	Depression	HCPs and Lay leaders	Community based and telephone	Yes	No	Yes	Yes	No	No	Yes	Yes

Manning	2014	UK	Education, Self-Management, and Upper Extremity Exercise Training in People with Rheumatoid Arthritis [EXTRA] program	Rheumatoid Arthritis	HCPs	Outpatient clinic	Yes	Yes	No	Yes	No	Yes	No	Yes
Mansouri	2019	Iran	Oral and Written Education Program	Heart failure	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Markle-Reid	2018	Canada	The program offered up to 3 in-home visits; monthly group wellness sessions; monthly case conferences; and ongoing nurse-led care coordination.	Type 2 Diabetes with 3+ comorbidites	HCPs and Lay leaders	Community based and home	Yes	No	No	Yes	No	Unclear	Yes	No
Marsden	2009	Australia	Community Living After Stroke for Survivors and Carers' (CLASSiC) - each session included a 1-hour physical activity followed by a 1-hour education delivered via presentations, group discussions and group activities	Stroke	HCPs	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No
Miller	2020	Canada	COMMENCE - chronic pain self-management support with pain science education and exercise	Chronic pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	No	No	No	Yes
Minshall	2020	Australia	Stroke Care Optimal Health Program (SCOHOP) Workbook based psychsocial intervention with education, self-management and reflective exercises	Stroke	Healthcare professional	Outpatient or Home or Telephone	Yes	Yes	No	Yes	Yes	Unclear	No	No

Mohammadpour	2015	Iran	A supportive educational intervention plus follow up telephone calls with information on functions of cardiovascular system, aetiology, management of MI risk factors, adherence to treatment and dietary regimens	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
Muchiri	2016	South Africa	Nutrition Education Programme	Diabetes	HCPs	Community based	Yes	Yes	No	Yes	Yes	Yes	No	No
Nguyen	2018	Vietnam	CKD booklet and a handout, one face-to-face session and two brief follow-up sessions.	Chronic Kidney Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	Yes
O'Toole	2021	Ireland	OPTIMAL intervention promoting accomplishments, vicarious learning, persuasion, interpretation of emotional states	Multimorbidity	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
P´erez-Escamilla	2015	USA	Culturally tailored diabetes education and counselling treatment group including education, skills, and support in the areas of nutrition, physical activity, blood glucose monitoring, medication adherence, and medical appointments.	Type 2 Diabetes	HCPs	Home	Yes	No	No	No	No	Unclear	Yes	Yes

Pinxsterhuis	2017	Norway	self-management program for coping with their illness and dealing with healthcare professionals and family, developed through educational presentations, the exchange of experiences, modelling of self-management skills, guided mastery practice, and informative feedback.	Chronic fatigue syndrome	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	Yes	Yes	No	No
Ridsdale	2018	UK	Self-management education for people with poorly controlled epilepsy (SMILE [UK]), based on MOSES	Epilepsy	HCPs	Community based	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Rothschild	2014	USA	Mexican American Trial of Community Health Worker (MATCH) knowledge and skills in diabetes self-management, with opportunities to practice goal setting and self-management.	Type 2 Diabetes	HCPs	Home	Yes	Yes	No	Yes	No	No	Yes	Yes
Sajatovic	2018	USA	TargetEd MAnageMent Intervention [TEAM]	Stroke and TIA	HCPs and Lay leaders	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Unclear	No	Yes
Salyers	2014	USA	Illness management and recovery - Incorporating psychoeducation, cognitive-behavioral approaches, relapse prevention, social skills training, and coping skills training.	Schizophrenia or schizoaffective disorder	HCPs	Community based	Yes	No	No	Yes	No	No	Yes	No
Smeulders	2010	The Netherlands	CDSMP	Congestive Heart Failure	HCPs and Lay leaders	Outpatient clinic	Yes	Yes	No	Yes	No	Unclear	No	No

Spencer	2011	USA	Racial and Ethnic Approaches to Community Health (REACH) Initiative - setting patient specific goals and supporting their progress	Diabetes	HCPs	Outpatient clinic and Home and Telephone	Yes	Yes	No	Yes	Yes	No	No	Yes
Still	2021	USA	TechSupport, integrating technology based components and emotional/empathic components known as positive psychological training	Hypertension	Healthcare professional	Web-based	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Stuifbergen	2010	USA	The Lifestyle Counts intervention developed from the Wellness for Women with MS curriculum	Fibromyalgia	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	Yes	No	Yes	No	No
Swoboda	2016	USA	Multiple-Goal Intervention - combination of goal setting and decision support coaching	Diabetes	HCPs	Outpatient clinic and Telephone	Yes	No	Yes	Yes	No	No	No	Yes
Taggart	2017	UK	DESMOND-ID (Diabetes and Self-Management for Ongoing and Newly Diagnosed for patients with Type 2 diabetes)	Type 2 Diabetes with intellectual disability	HCPs	Community based	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Thoolen	2009	The Netherlands	Beyond Good Intentions – a 12-week self-management course	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	Yes
Van der Meer	2009	The Netherlands	Internet based self-management program asthma control monitoring and treatment advice, online and group education, and remote Web communications with a specialized asthma nurse.	Asthma	HCPs	Web-based and Unclear	Yes	Yes	No	Yes	No	Unclear	No	Yes

van Erp	2019	Netherlands	Back on Track education, self-management and goal setting intervention, including cognitive behavioural approaches	Chronic lower back pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Van Rooijen	2010	South Africa	Dietary and physical activity education for ongoing nutrition self-management and physical activity	Type 2 Diabetes	HCPs	Outpatient clinic	Yes	No	No	No	No	Unclear	No	Yes
Vos	2019	The Netherlands	Beyond Good Intentions	Type 2 Diabetes	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Walker	2011	USA	Telephonic behavioural intervention focused on medication adherence and lifestyle changes through healthy eating and physical activity	Diabetes	HCPs	Telephone	Yes	No	No	Yes	Yes	Unclear	No	Yes
Walsh	2020	UK	FASA facilitating activity and self-management through problem solving and exercise derived from ESCAPE intervention	Lower limb osteoarthritis and chronic lower back pain	Healthcare professional	Community Based	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Wang	2016	Singapore	The Myocardial Infarction Home-based Self-management Programme (MIHSMP) with Heart Recovery Education Booklet (HREB)	Myocardial Infarction	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wang	2018	Singapore	Coronary Heart Disease Self-management Programme (CHDSMP)	Coronary Heart Disease	HCPs	Home and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Webel	2010	USA	Positive Self-Management Program (PSMP)	HIV	Lay leaders	Community based	Yes	Yes	No	No	No	Unclear	No	No

Wegener	2009	USA	Promoting Amputee Life Skills Self-management program	Limb loss	HCPs and Lay leaders	Community based	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Wolf	2017	USA	CDSMP	Stroke	HCPs	Outpatient clinic	Yes	Yes	Yes	No	No	Unclear	No	No
Wu	2017	Australia and Taiwan	T-CDSMP adapted for Taiwanese speaking	Cardiovascular disease and Diabetes	HCPs	Outpatient clinic and Telephone	Yes	Yes	No	No	No	Unclear	No	No
Wu	2018	Taiwan	Innovative self-management intervention a video, trainee manual, participation in the self-efficacy-enhancing program, and telephone interviews	End Stage Renal Disease	HCPs	Outpatient clinic and Telephone	Yes	Yes	Yes	No	No	Unclear	No	Yes
Yip	2008	Hong Kong	ASMP with added goal-directed exercise component	Osteoarthrits	HCPs	Outpatient clinic	Yes	Yes	No	No	No	Unclear	No	Yes
Young	2016	China	Psycho-education group understanding dementia, coping skills, exercise, diet, mood, own strengths, accepting change, communication, relationships, the future	Major neurocognitive disorder	HCPs	Community based	Yes	Yes	No	No	No	Unclear	No	No
Zakrisson	2018	Sweden	Self-management intervention based on Bandura's theory of self-efficacy using techniques such as performance mastery, modelling, interpretation of symptoms, and social persuasion	COPD and Coronary Heart Failure	HCPS	Community based	Yes	Yes	No	Yes	Yes	Unclear	Yes	No
Zhang	2015	USA	Stay Dry program biofeedback pelvic floor muscle exercise plus a support group or telephone contact	Prostate cancer with urinary incontinence	HCPs	Telephone and unclear	Yes	Yes	No	No	No	Unclear	No	Yes