

The effectiveness of the teach-back method on adherence and self-management in health education for people with chronic disease: a systematic review

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Executive summary

Background

Chronic diseases are increasing worldwide and have become a significant burden to those affected by those diseases. Disease-specific education programs have demonstrated improved outcomes, although people do forget information quickly or memorize it incorrectly. The teach-back method was introduced in an attempt to reinforce education to patients. To date, the evidence regarding the effectiveness of health education employing the teach-back method in improved care has not yet been reviewed systematically.

Objectives

This systematic review examined the evidence on using the teach-back method in health education programs for improving adherence and self-management of people with chronic disease.

Inclusion criteria***Types of participants***

Adults aged 18 years and over with one or more than one chronic disease.

Types of intervention

All types of interventions which included the teach-back method in an education program for people with chronic diseases. The comparator was chronic disease education programs that did not involve the teach-back method.

Types of studies

Randomized and non-randomized controlled trials, cohort studies, before-after studies and case-control studies.

Types of outcomes

The outcomes of interest were adherence, self-management, disease-specific knowledge, readmission, knowledge retention, self-efficacy and quality of life.

Search strategy

Searches were conducted in CINAHL, MEDLINE, EMBASE, Cochrane CENTRAL, Web of Science, ProQuest Nursing and Allied Health Source, and Google Scholar databases. Search terms were combined by AND or OR in search strings. Reference lists of included articles were also searched for further potential references.

Methodological quality

Two reviewers conducted quality appraisal of papers using the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument.

Data extraction

Data were extracted using the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument data extraction instruments.

Data synthesis

There was significant heterogeneity in selected studies, hence a meta-analysis was not possible and the results were presented in narrative form.

Results

Of the 21 articles retrieved in full, 12 on the use of the teach-back method met the inclusion criteria and were selected for analysis. Four studies confirmed improved disease-specific knowledge in intervention participants. One study showed a statistically significant improvement in adherence to medication and diet among type 2 diabetics patients in the intervention group compared to the control group ($p < 0.001$). Two studies found statistically significant improvements in self-efficacy ($p = 0.0026$ and $p < 0.001$) in the intervention groups. One study examined quality of life in heart failure patients but the results did not improve from the intervention ($p = 0.59$). Five studies found a reduction in readmission rates and

hospitalization but these were not always statistically significant. Two studies showed improvement in daily weighing among heart failure participants, and in adherence to diet, exercise and foot care among those with type 2 diabetes.

Conclusions

Overall, the teach-back method showed positive effects in a wide range of health care outcomes although these were not always statistically significant. Studies in this systematic review revealed improved outcomes in disease-specific knowledge, adherence, self-efficacy and the inhaler technique. There was a positive but inconsistent trend also seen in improved self-care and reduction of hospital readmission rates. There was limited evidence on improvement in quality of life or disease related knowledge retention.

Implications for practice

Evidence from the systematic review supports the use of the teach-back method in educating people with chronic disease to maximize their disease understanding and promote knowledge, adherence, self-efficacy and self-care skills.

Implications for research

Future studies are required to strengthen the evidence on effects of the teach-back method. Larger randomized controlled trials will be needed to determine the effectiveness of the teach-back method in quality of life, reduction of readmission, and hospitalizations.

Keywords

Teach-back, ask-tell-ask, closing the cycle, health education, adherence, self-management, knowledge retention, self-efficacy, hospital readmission, quality of life

Background

The prevalence of chronic diseases

Chronic diseases are diseases that last for a long duration and progress slowly. According to the Australian Institute of Health and Welfare, chronic diseases are related to multiple causalities and associated factors, are rarely cured completely, and are likely to lead to health complications and disability.¹ A recent World Health Organization (WHO) report revealed that nearly 63% of deaths globally were due to chronic disease, primarily as a result of cardiovascular, cancer, diabetes and respiratory conditions.² This mortality is exacerbated in low-income and middle-income countries,² and where a high prevalence (80%) of the population over the age of 65 years has three or more chronic diseases.³ People at a greater risk of developing chronic diseases are those who are older, obese, of low socio-economic status, or live alone.⁴ Multiple chronic diseases have been demonstrated to have a considerable negative effect on peoples' quality of life.⁴

Self-management in chronic disease

Self-management approaches are designed to assist people and their families to better manage their own chronic diseases, and these programs typically focus on symptom recognition and self-monitoring, medication adherence, diet control, exercise, weight control, and reduction in smoking

and alcohol consumption.⁵ These programs have contributed to reductions in hospitalizations, readmission rates,^{6,7} days in hospital, outpatient visits, health care utilization and costs.⁸ Compared with standard care, self-management programs benefit people in terms of knowledge acquisition, performance of self-management behaviors, self-efficacy and overall health status.^{8,9} Thus, self-management becomes a central point for chronic disease care,⁸ and may improve treatment adherence¹⁰ and quality of life,¹¹ and reduce heart failure hospitalizations and readmission rates,^{6,7,10} days in hospital; outpatient visits and mortality.

A common aim of self-management interventions is to increase the active participation of people in managing their own health through improving understanding of their disease.¹² However, many individuals have difficulty understanding the information delivered by health professionals for reasons such as low health literacy, and the method and timing of information delivery. Research suggests that 40-80% of the medical information patients receive is forgotten immediately; and nearly half of the information retained is incorrect.¹³ People with low literacy and low health literacy are more likely to have a poorer understanding of their chronic disease.¹⁴ Clinician-related barriers may include poor communication with patients, lack of time for consultation, and failure to provide information at a suitable level for patient understanding.¹⁵ Consequently, there is a need to identify effective educational strategies suitable for people of all literacy levels to help them better understand their condition, as well as positively impact their adherence and self-management.

Current adherence to self-management in chronic disease

Adherence to treatment refers to how people follow healthcare professionals' advice regarding medication and lifestyle modifications in order to maximize healthcare outcomes. The WHO suggests that individuals who have good treatment adherence have fewer complications and disabilities, better quality of life and increased life expectancy.⁸ In addition, better adherence can prevent other adverse risks such as medication side-effects, toxicity from over-use of medication, or resistance to therapies.⁸ However, non-adherence to treatment regimens is a common problem for those with chronic disease.^{16,17} A number of studies have reported high rates of non-adherence ranging from 15-93% depending on the type and number of chronic diseases¹⁸ with an estimated average of 50%.^{8,18} There are several consequences of low adherence to long-term therapies, including poorer health outcomes and increased healthcare costs.⁸

The teach-back method for teaching self-management

One method of teaching an individual about their chronic disease and self-care management is called teach-back. Teach-back, also known as "show me" or "closing the loop", is a method that aims to increase peoples' understanding of the disease information being communicated in a health education session by asking them to repeat back key points of the instruction.¹⁹ The method includes a process of questioning to determine what the person has understood from the interaction. Examples of the questions include: "Can you please tell me what we have discussed today?" or "What can you tell your wife/husband about the changes in your daily diet?", etc. If the person responds with an incorrect explanation or seems to have a gap in understanding, the care providers can identify what information should be repeated or clarified. The cycle continues until the person answers correctly.¹⁴ In this way understanding is assessed and healthcare professionals can identify an education strategy that is commonly understood by almost all people. Teach-back is not a test of the person's knowledge as much as an exploration of how well the information has been taught and what needs to be clarified or reviewed.²⁰ Because teach-back does not require any particular level of literacy, it allows those with

low literacy levels to actively participate and for information to be reiterated. Teach-back is useful in assisting people to understand treatment regimens and disease warning signs.^{14,21}

An initial review of the literature indicates that teach-back has been used as an educational strategy for health care professionals,^{22,23} low-income women,^{24,25} people with low health literacy,^{21,26,27} and for those with a chronic disease.^{28,29} A number of studies have targeted the use of teach-back in chronic disease education programs to improve a person's comprehension,²⁰ and informed consent³⁰ and to reduce hospital readmission,^{31,32} although the usefulness of teach-back in improving chronic disease adherence and self-management has been subjected to less investigation. Moreover, the duration of health education, retention and follow-up periods in studies that have incorporated the teach-back method appears to be variable. Most studies have described the use of teach-back as a pilot intervention rather than routine practice.^{24,25,33} Therefore, this systematic review is necessary to identify evidence on the teach-back method in improving self-management and adherence outcomes for people with chronic disease, and to determine how the teach-back method is best delivered. The methods of this review were specified in advance in a previously published protocol.³⁴

Objectives

The objectives of this review were to identify the effectiveness of the teach-back method as a component of health education. More specifically, the objectives were to identify the effectiveness of teach-back education on disease-specific knowledge, medication and care adherence, and specific self-management skills in adult patients with chronic diseases.

Inclusion criteria

Types of participants

This review included all studies that involved adult patients (aged 18 years and over) in any healthcare setting, either as inpatients (e.g. acute care, medical and surgical wards) or those who had attended primary health care, family medical practice, general medical practice, clinics, outpatient departments, rehabilitation or community settings.

Included study participants were those with one or more chronic disease including heart failure, diabetes, cardiovascular disease, cancer, asthma, chronic obstructive pulmonary disease, chronic kidney disease, arthritis, epilepsy or a mental health condition. Studies that included seriously ill patients, and/or those with impairments in verbal communication and cognitive function were excluded.

Types of intervention(s)

Eligible studies were those which reported on the use of the teach-back method alone or in combination with other supporting educational strategies, either in routine or research intervention education programs, regardless of how long the programs were or whether or not a follow-up was conducted. The intervention could be delivered by any healthcare professional. The comparator was any health education for chronic disease that did not include the teach-back method.

Types of studies

This review considered quantitative studies including randomized controlled trials (RCTs), non-randomized controlled trials, quasi-experimental studies, case-controlled studies, cohort studies, and before and after studies that evaluated the effect of teach-back.

Types of outcomes

Selected outcomes were disease-specific knowledge, medication and care adherence, and specific self-management skills. Secondary outcomes included knowledge retention, disease-specific self-efficacy, hospital readmission, hospitalization and quality of life. All outcomes were measured using patient self-report scales, nursing observation or hospital records.

Search strategy

The search strategy aimed to find both published and unpublished studies. A three-step search strategy was utilized in this review. An initial limited search of MEDLINE and CINAHL was undertaken followed by an analysis of the text words contained in the titles and abstracts to describe the articles (see Appendix I for the MEDLINE search strategy example). A second search using all identified keywords and index terms was undertaken across all included databases. Thirdly, the reference lists of all eligible articles were searched for additional studies. Studies published in English were considered for inclusion in this review. In order to attain the widest range of studies, no limits were set for the date of publication. The search was done in August 2013, and an alert was set up throughout databases to chase newly published articles.

The databases searched were CINAHL, MEDLINE, EMBASE, Cochrane CENTRAL Trials Register and Web of Science. A grey literature search was performed to identify unpublished studies in ProQuest Nursing and Allied Health Source and Google Scholar.

Initial keywords used were “teach-back”, “ask-tell-ask”, “show-me”, “self-management”, “self-care”, “adherence”, “compliance”, “chronic disease” and “chronic illness”. Keywords were combined using Boolean operators such as ‘OR’ and ‘AND’ for the search. An alert was set in each database with the search terms to track the newly published articles.

Method of the review

Two reviewers (HD, AB) independently selected titles and screened abstracts prior to retrieving full texts. The full-texts were assessed for eligibility in respect to type of participants, study design and outcomes. Papers selected for retrieval were assessed for methodological validity prior to inclusion in the review; using standardized critical appraisal instruments from the JBI-MAStARI (see Appendix II). The 10-item appraisal tool for RCTs and quasi-experimental studies and the nine-item tool for cohort/case-control or descriptive studies were used. Any disagreements that arose between the reviewers (HD, AB) were resolved through discussion, or with two other reviewers (JR, RC).

Data extraction

Two reviewers (HD, AB) independently extracted data from included papers using an adapted version of the standardized data extraction tool from JBI-MAStARI (see Appendix III). The data extracted were participant characteristics (age, gender, diagnosis, co-morbidity), details of the interventions (teach-back and other educational component as a usual or intervention care, length of educational session, follow-up period) and outcomes measured (knowledge, adherence, disease-specific self-management skills, readmission, knowledge retention, self-efficacy, quality of life). No disagreements arose between the reviewers (HD, AB) during data extraction.

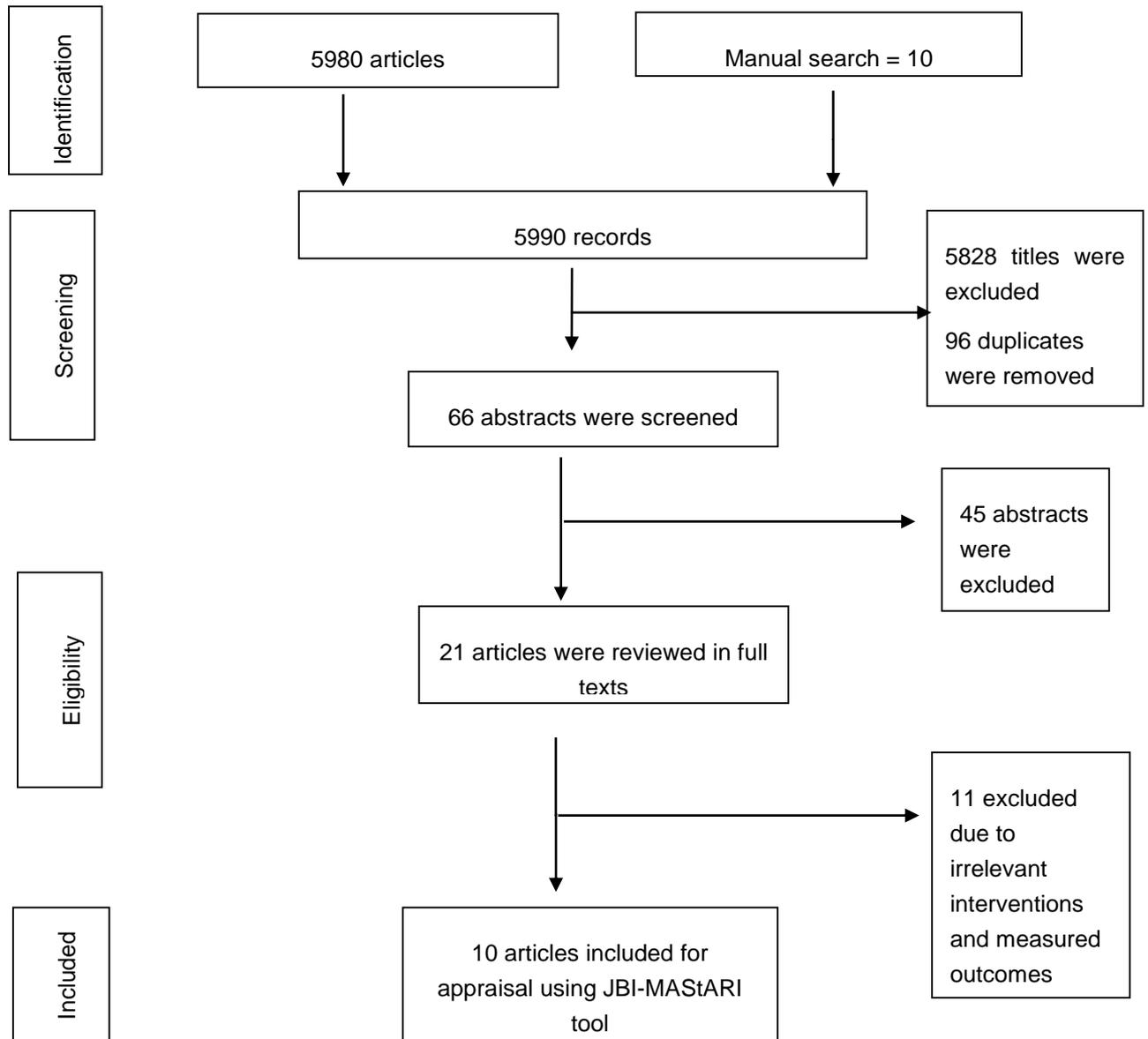
Data synthesis

No meta-analysis could be conducted due to clinical heterogeneity in the interventions, study population, duration of interventions, follow-up and measurement scales. Results of measured outcomes are reported in narrative form.

Results

Description of studies

The search of the selected databases generated 5980 citations. Manual searching of published systematic reviews and potential articles yielded 10 further articles. After removing 96 duplicate titles, articles were screened for eligibility and 5828 discussion papers, editorials or conference abstracts were removed. Sixty-six abstracts were screened for eligibility. Of these, 45 abstracts were excluded, and 21 articles retrieved in full texts. Of the 21 studies, 11 were excluded for irrelevant interventions (did not use the teach-back method) or measured outcomes (for details, see Appendix IV). Ultimately, 10 articles met the inclusion criteria involving participants with heart failure (n=4) or COPD/asthma (n = 4) or diabetes (n = 2). Of these, eight were non-randomized/randomized controlled trials, one cohort study and one before-after study. No further articles were retrieved from the reference lists of selected articles. The flowchart of the inclusion process is presented in Figure 1. There was no disagreement between reviewers on the selection of studies.



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

Figure 1: Study selection flow chart

Methodological quality

Results of quality appraisal are presented in Table 1. The majority of included studies had appropriate sampling, clear inclusion criteria, adequate follow-up duration, reliable outcome measurement and analysis. All studies achieved “Yes” to at least 50% of applicable questions. All studies assessed were considered to be of sufficient methodological quality for inclusion in the review.

Table 1: Quality appraisal of the included articles

First author, year	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
<i>RCT/pseudo-randomized trial</i>										
Bosnic-Anticevich SZ, 2010 ³⁵	Y	Y	N	N	U	Y	Y	Y	Y	Y
Davis KK, 2012 ³⁶	U	U	U	U	U	Y	Y	Y	Y	Y
DeWalt DA, 2006 ³⁷	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Kiser K, 2012 ³⁸	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
Krumholz HM, 2002 ³⁹	U	U	U	Y	Y	Y	Y	Y	Y	Y
Negaramdeh R, 2011 ⁴⁰	Y	Y	N	Y	N	Y	Y	Y	Y	Y
Press V, 2012 ⁴¹	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Rydman RJ, 1999 ⁴²	U	U	U	U	Y	Y	Y	Y	U	Y
%	62.5	62.5	37.5	62.5	37.5	100	100	100	87.5	100
<i>Before—after study</i>										
Swavely D, 2013 ⁴³	NA	N	NA	Y	U	NA	NA	Y	Y	Y
%	NA	0	NA	100	0	NA	NA	100	100	100
<i>Cohort study</i>										
White M, 2013 ⁴⁴	N	Y	U	Y	NA	Y	U	Y	Y	----
%	0	100	0	100	NA	100	0	100	100	

Note: Y= Yes N = No U = Unclear NA = Not Applicable

Characteristics of included studies

Ten studies were included in this review involving a total of 1285 patients (487 males and 738 females). Outcomes measured across the studies were categorized as disease-specific knowledge,^{36,37,40,43} adherence to medication and diet,⁴⁰ self-care,^{36,37,43} self-efficacy,^{37,43} health-related quality of life,³⁷ readmission and hospitalizations,^{36,37,39,41,44} and knowledge retention.⁴⁴ Articles were mostly from United State of America,^{36-39,41-43} with one paper from Australia³⁵ and one from Iran.⁴⁰ Studies were conducted in community pharmacies,³⁵ academic hospitals,^{36-38,41,44} hospitals,³⁹ diabetes clinic,⁴⁰ asthma clinic⁴² and primary medical practices.⁴³ Studies were specifically aimed at more disadvantaged people including those with mild cognitive impairment,³⁶ co-morbidity³⁶ and low health literacy.^{37,38,40} All participants in studies were adults; the average age of participants in nine studies was 50 years and over,^{36-39,41,43,44} whereas two studies of them specifically targeted people aged 70 years and over.^{39,44}

There was little consistency among studies in relation to delivery method, duration, educational components and persons who conducted the health education programs. Only one study⁴³ described the teach-back method as routine care while other studies employed the teach-back method as a part of the whole study intervention. Interventions involved educational content delivered with the teach-back method in one-on-one teaching sessions and during follow-up phone calls,^{36,37,39,44} in addition to providing participants with self-care tools (weighing scales, pill boxes, measuring cups)^{36,37,44} and written educational materials.^{35-40,42-45} A patient workbook³⁶ was used to assist with monitoring the self-care schedule, medication use and documenting symptoms. Three study interventions focused on educating participants on mastering a specific task (e.g. inhaler technique),^{35,41,42} while others attempted to increase understanding of disease state, symptoms and self-care. One study used problem based scenarios recorded on audio tape for participants to review at home as a reinforcement strategy.³⁶

The written educational resources that complemented the teach-back process were delivered in various forms, e.g. booklets,^{36,37,39} pamphlets,⁴¹ handouts³⁸ and product instruction leaflets.^{35,42} Pictograms or visual cues were used in addition to teach-back,^{36,40} as the teach-back interaction occurred in counseling sessions delivered to participants at home, during hospitalization,^{35,37,38,40-44} at hospital discharge³⁹ and during follow-up phone calls.³⁶ Education was delivered by nurses,^{39,40} case managers,³⁶ pharmacists,⁴³ research assistants^{37,38,42,45} and a dietician.⁴³ The educational content was delivered to participants in a single session or multiple sessions, varying from minutes to hours. Follow-up varied largely between studies and data collection aimed to detect changes in short-term outcomes (knowledge, knowledge retention, performance of self-care skills) and long-term outcomes (readmission, self-care behaviors). Appendix V presents the main characteristics of selected articles.

Effects of health education using “teach-back” on adherence

Among the 10 studies selected, only one three-arm randomized controlled trial reported adherence as one of the measured outcomes.⁴⁰ One hundred and twenty-seven adults with type 2 diabetes who had low health literacy were randomized to receive routine care (control group) or three weekly educational sessions, each lasting 20 minutes, delivered via either the teach-back method or pictorial images (two intervention groups). All participants were followed up for six weeks. There were significant improvements in both adherence to dietary (3.63 versus 5.87 and 6.15 out of maximum 9 score) and medication regimens (4.32 versus 6.73 and 7.03 out of maximum 8) in the control group, the two pictorial images group and the teach-back group. All differences in dietary and medication adherence were statistically significant ($p < 0.001$). The control group also improved, although a much larger improvement was seen in the two intervention groups. The difference between end-point and baseline of the adherence to diet and medication in the teach-back method group was found to be larger than that in the pictorial images groups; however, the difference was not significant.

Effects of health education using “teach-back” on disease-specific knowledge and knowledge retention

Three RCTs and one before-after study involving a total of 652 participants measured heart failure^{36,37} and diabetes knowledge.^{40,43} One cohort study with 276 participants measured recall of teach-back questions as the study's outcome.⁴⁴ Disease-specific knowledge was measured at varying follow-up durations, 30 days,³⁶ six weeks⁴⁰ and six months later while knowledge retention was assessed seven days after discharge from hospital. Studies employed previously validated questionnaires^{36,43} and self-developed instruments^{37,40} to measure disease-specific knowledge. Knowledge retention was

measured by percentage of participants answering correctly at least three of the four teach-back questions regarding name of diuretic medication, alert at weight gain, avoiding high-salt foods and warning signs to call their health care provider.⁴⁴

Four studies^{36,37,40,43} reported significant increase in knowledge scores following the intervention. Another study found that a larger change in diabetes knowledge score was seen in groups who received the teach-back method than that in those educated using pictorial images, although this difference was not significant. Swavely et al.'s study revealed the knowledge improved significantly especially in a group with low baseline health literacy.⁴³ The reported knowledge retention of participants in White et al.'s study⁴⁴ appeared to decrease after 7 days post-discharge (84.4% participants answered teach-back questions correctly during hospitalization versus 77.1% answered correctly at follow-up assessment). Knowledge regarding "avoid high salt foods" and "warning signs" was seen to be reinforced during follow-up (99.5% answered correctly). This study raised a notable limitation that a large number of participants missed follow-up assessment (37.7%), which indicates the percentage of participants correctly answering retention questions might be under- or over-estimated.⁴⁴

Effects of health education using "teach-back" on disease-specific self-care

Three studies measured self-care behavior in people with heart failure^{36,37} and diabetes⁴³ as study outcomes. Overall, there was improved self-care in people in the intervention group compared to the control group but this was not always significant. One RCT involving 123 heart failure participants found that after 12 months, more people in the intervention group, who were provided with digital weighing scales, reported daily weight than the control group (79% versus 29%, $p < 0.001$).³⁷ In another study, self-care behaviors related to diet, exercise and foot care improved among participants with diabetes following their participation in the education program (all $p < 0.001$).⁴³ Being able to control blood glucose levels was not significant ($p = 0.345$) but there was a trend towards improvement. Another study reported that those with heart failure with mild cognitive impairment showed improvement in self-care levels in both intervention and control groups but this change was not statistically significant.³⁶ In this study the effect of the intervention was assessed at 30 days post-intervention and this might not have provided sufficient time to demonstrate self-care behavior change. Moreover, the majority of participants had multiple chronic conditions (82% in control and 86% in intervention),³⁶ which may have impacted on self-care capacity. The influence of co-morbidity on self-care ability was not investigated in this study.

Four studies^{35,38,41,42} reported improved patient skill with the use of an inhaler device in favor of the intervention group. Correct inhaler device use was seen in the intervention group earlier than in the control group (at visit 2 versus visit 4 post education).³⁵ In another two studies, the inhaler device technique improved significantly in both the intervention and control groups.^{41,42} Additionally, the rate of inhaler device misuse was reduced significantly after receiving either teach-back or verbal instructions regardless of the study group.⁴¹

Effects of health education using "teach-back" on hospital readmission and hospitalization

Five studies involving people with heart failure^{36,37,39,44} and COPD/asthma⁴¹ measured readmission and hospitalizations as study outcomes. Generally fewer readmissions and hospitalization were seen in the intervention groups, although they were not always statistically significant. Krumholz et al. reported a 39% reduction in all-cause hospital readmission rates in the intervention group compared

with that of the control group³⁹ ($p=0.06$), while cardiac-cause readmission was significantly reduced in the intervention group (RR: 0.63, 95% CI: 0.46, 0.86). Another study showed a low heart failure-related readmission rate of 3.3% among 276 participants at 12 months follow-up.⁴⁷ This study also found that participants who answered teach-back questions correctly after hospital discharge did not show a significant difference in readmission rates compared to those who answered incorrectly.⁴⁴ Fewer hospitalizations were also seen in the intervention participants although a significant difference to those in the control group was not detected.^{36,39,41} These studies indicate that a reduction in readmission rates or hospitalizations might be a promising outcome for studies with the teach-back method, although further explorations are required to provide stronger evidence.

Effects of health education using “teach-back” on health-related quality of life (HRQoL)

Only one study³⁷ involving people with heart failure ($n=123$) reported HRQoL as a study outcome. There was no significant improvement in HRQoL, measured by the Minnesota Living with Heart Failure Questionnaire in either the intervention or control group after a follow-up at 12-months. After adjusting for baseline differences between the two groups, the mean difference in HRQoL was 2 points (95% CI 9, -5, $p=0.59$). Therefore the estimate of the interventions involving the teach-back method on improved HRQoL remained unknown.

Effects of health education using “teach-back” on disease-specific self-efficacy

Two studies^{37,43} reported self-efficacy as a study outcome. There was a significant improvement in self-efficacy scores in favor of those in the intervention groups in both studies. In one study using the eight-item self-developed self-efficacy instrument (score from 0-24), the mean difference in self-efficacy score improved by 2 points at the end of the study (95% CI 0.7, 3.1; $p=0.0026$).³⁷ Another study, measuring the outcome by the Stanford Diabetes Self-Efficacy Tool score of 1 - 10, reported a significant improvement in mean self-efficacy scores from baseline and at the end of the program (6.59 versus 8.47 respectively, $p < 0.001$). These two studies indicate that using the teach-back method in health education was more likely to result in improved participants' self-efficacy.

Discussion

The purpose of undertaking this systematic review was to examine the effect of the teach-back method as part of an educational program or intervention for people with chronic diseases. Due to the variation in study design and differing outcomes, a narrative analysis was undertaken. The systematic review included 10 studies. The distribution and quantity of these studies suggest that the teach-back method has not been investigated widely or in a range of populations with chronic diseases. There was also variation among the 10 selected studies with respect to educational components, duration, follow-up period, educators and measured outcomes. The difference between the interventions reflects the varied ways health education with the teach-back method is delivered. The control groups also differed as some studies involved usual care or/plus either verbal instructions or written materials. Self-reported outcomes were measured using a range of validated or self-developed instruments; however, the use of different instruments, especially those developed for a particular study, negatively impacts the validity of outcomes measured.

Overall, the teach-back method showed positive effects although this was not always statistically significant. Studies in this systematic review revealed significantly improved outcomes in disease-specific knowledge, adherence, self-efficacy and inhaler technique competence as results of the teach-back method of education. There was a positive but inconsistent improvement also seen in self-

care, hospital readmission and hospitalization. There was a lack of strong evidence on the effects of the teach-back method on improving HRQoL or retention of knowledge. The teach-back method was mostly used to reinforce delivered information, particularly for disadvantaged people, older adults and those with low levels of health literacy.

Disease-specific knowledge increased significantly in four studies. People with low health literacy generally achieved greater disease-specific knowledge gains than those with high health literacy.⁴⁶ In another systematic review, educational programs for people with diabetes improved knowledge about this disease.^{47,48} Although knowledge is improved across participants receiving the education with the teach-back method, knowledge retention has also been observed to decrease by time.⁴⁴ Therefore, ways to maintain knowledge need to be included in education programs.

All selected studies in this systematic review consisted of at least one self-management component, which accounted for positive change in enhancing self-care activities. Simple specific self-management tasks (e.g. daily weighing, inhaler use technique) were improved significantly when teach-back was included in the education program. Existing studies show that providing individuals with self-care tools (weighing scale, inhaler, measuring cup) is associated with achieving desired behavioral changes,^{35,37,41,42} and when combined with teach-back, adherence with self-management behaviors could be further improved.

Only one study explored HRQoL (heart failure) and the outcome was not improved significantly. This finding could be due to study participants having high baseline HRQoL levels. In addition, HRQoL is a multi-dimensional subjective concept and the selected study in this review might be not comprehensive enough to have a significant change. Another systematic review of self-management programs for people with heart failure did find that HRQoL improved.¹¹ This indicates the possibility that integrating the teach-back method in self-management programs could improve the HRQoL in individuals with chronic disease.

Selected studies revealed a hypothesized but not significant reduction in readmission or hospitalization among intervention participants. White's study⁴⁴ specifically found that people who were able to correctly answer teach-back questions had no difference in hospital readmissions compared to those who could not answer questions correctly. Since the teach-back method was shown to reduce hospital readmissions in previous literature,^{49,50} the lack of consistent and strong evidence in this review suggests a need for further research on the teach-back method. As readmission is closely associated with exacerbating disease symptoms, future intervention needs to include early recognition of worsening symptoms in educating self-care to patients.

This systematic review has several limitations. Despite a comprehensive search across electronic databases, eligible studies might have been missed if the teach-back method was not described in studies. In addition, this review included only studies published in English so additional studies written in other languages may have been missed. This fact might result in an overestimation or underestimation of the effect of programs using the teach-back method. Another limitation of this review was the majority of studies in this review had small sample sizes, and in addition, there was heterogeneity in research designs and the way outcomes were measured. Therefore, it was not possible to pool studies so the effect estimate of the teach-back method could not be evaluated.

Conclusion

This systematic review summarizes current studies using the teach-back method to deliver health education to people with chronic diseases. The teach-back method was shown to benefit various health outcomes including disease-specific knowledge, adherence, self-efficacy, inhaler technique competence. There was a positive trend towards improved self-care, reduction of hospital readmission, hospitalization or deaths. There was a lack of evidence on the effect of the teach-back method on improving HRQoL or retention of knowledge.

Implications for practice

Evidence from the systematic review supports the use of the teach-back method in educating people with chronic disease to maximize their understanding of the disease and promote knowledge, adherence, self-efficacy and self-care skills. The following are specific recommendations arising from the review (see Appendix VI for JBI Grades of Recommendation):

- Integrate the teach-back method into education for patients and prioritize disadvantaged people such as those with chronic diseases, low literacy, cognitive impairment and older adults. (Grade A)
- Involve all health care professionals in using the teach-back method to maximize patients' understanding of disease state, treatment, care and prevention of complications. (Grade A)
- Use the teach-back method in follow-up and reminding patients to maintain the obtained knowledge, adherence and self-efficacy. (Grade A)

Implications for research

Further studies with sufficient sample sizes and rigorous implementation are necessary to explore the effect of the teach-back method on self-care, readmission rates, health-related quality of life and knowledge retention. It is possible that more rigorous studies with longer follow-up periods may find results different from those included in this review.

Conflict of interest

The authors declare that there were no conflicts of interest.

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Appendix I: MEDLINE search strategy

S1	teach-back* OR "teach back" OR show-me OR "show me" OR "closing the loop" OR "closing the cycle" OR "ask-tell-ask" OR "repeat* instruction"
S2	"health education*" OR "education* program#" OR discharge* OR "education* intervention"
S3	knowledge OR adheren* OR complian* OR non-adherence OR "non compliance" OR self-management*
S4	"knowledge retention" OR "health literacy" OR self-efficacy OR readmission OR comprehension OR "quality of life"
S5	Chronic* OR "heart failure" OR diabet* OR cardiovascular* OR cancer OR "respiratory disease" OR asthma OR "chronic obstructive pulmonary disease" OR "chronic kidney disease" OR arthritis OR epilepsy OR mental*
S6	S3 OR S4
S8	S1 AND S5 AND S6

Appendix II: MASTARI appraisal instruments

JBI Critical Appraisal Checklist for Randomised Control / Pseudo-randomised Trial

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was the assignment to treatment groups truly random?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were participants blinded to treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was allocation to treatment groups concealed from the allocator?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were those assessing outcomes blind to the treatment allocation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Were the control and treatment groups comparable at entry?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were groups treated identically other than for the named interventions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in the same way for all groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Descriptive / Case Series

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Was study based on a random or pseudo-random sample?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the criteria for inclusion in the sample clearly defined?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. If comparisons are being made, was there sufficient descriptions of the groups?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info

Comments (Including reason for exclusion)

JBI Critical Appraisal Checklist for Comparable Cohort/ Case Control

Reviewer Date

Author Year Record Number

	Yes	No	Unclear	Not Applicable
1. Is sample representative of patients in the population as a whole?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Are the patients at a similar point in the course of their condition/illness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Has bias been minimised in relation to selection of cases and of controls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Are confounding factors identified and strategies to deal with them stated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are outcomes assessed using objective criteria?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was follow up carried out over a sufficient time period?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were the outcomes of people who withdrew described and included in the analysis?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were outcomes measured in a reliable way?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was appropriate statistical analysis used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall appraisal: Include Exclude Seek further info.

Comments (Including reason for exclusion)

Appendix III: MASTARI data extraction instruments

JBI Data Extraction Form for Experimental / Observational Studies

Reviewer Date

Author Year

Journal Record Number

Study Method

RCT Quasi-RCT Longitudinal
 Retrospective Observational Other

Participants

Setting _____
 Population _____

Sample size

Group A _____ Group B _____

Interventions

Intervention A _____

 Intervention B _____

Authors Conclusions:

Reviewers Conclusions:

Study results

Dichotomous data

Outcome	Intervention () number / total number	Intervention () number / total number

Continuous data

Outcome	Intervention () number / total number	Intervention () number / total number

Appendix IV: Excluded articles and reasons for their exclusion

Number	Excluded papers	Reasons for exclusion
1	Goossens E, Van Deyk K, Zupancic N, Budts W and Moons P. Effectiveness of structured patient education on the knowledge level of adolescents and adults with congenital heart disease. <i>European Journal of Cardiovascular Nursing</i> . 2014; 13(1), 63-70.	This study did not investigate the use of the teach-back method.
2	Hahn SR, Friedman DS, Quigley HA, et al. Effect of patient-centered communication training on discussion and detection of nonadherence in glaucoma. <i>Ophthalmology</i> . 2010; 117(7): 1339-47.	Outcomes were physicians' communication, not the effect on patients' non adherence.
3	Kumanyika SK, Adams-Campbell L, Van Horn B, et al. Outcomes of a cardiovascular nutrition counseling program in African-Americans with elevated blood pressure or cholesterol level. <i>Journal of the American Dietetic Association</i> . 1999; 99(11): 1380-91.	The intervention was aimed at lipid level and blood pressure control after 12 months. The intervention included food-picture cards, nutrition guide, video and audiotape and nutrition class. However, the use of the teach-back method was not specified.
4	Mancuso CA, Peterson MGE, Gaeta TJ, et al. A Randomized Controlled Trial of Self-Management Education for Asthma Patients in the Emergency Department. <i>Annals of Emergency Medicine</i> . 2011; 57(6): 603-12.	The intervention included provision of a workbook and asked patients to make a contract to change their asthma behavior. Patients were taught to use inhaler device and used a checklist to assess proficiency. However, teach-back method was not specified.
5	Ogedegbe G, Tobin JN, Fernandez S, et al. Counseling African Americans to Control Hypertension (CAATCH) Trial: A Multi-Level Intervention to Improve Blood Pressure Control in Hypertensive Blacks. <i>Circulation: Cardiovascular Quality and Outcomes</i> . 2009; 2(3): 249-56.	This is a protocol with no actual data.
6	Rathkopf MM, Quinn JM, Proffer DL and Napoli DC. Patient knowledge of immunotherapy before and after an	The participants were randomly assigned into three groups: the control group, intervention group 1 receiving an educational

	educational intervention: a comparison of 2 methods. <i>Annals of Allergy Asthma & Immunology</i> . 2004; 93(2): 147-53.	handout, and intervention group 2 receiving one-on-one educational sessions from 10-15 minute, but the use of teach-back method was not specified.
7	Verver S, Poelman M, Bögels A, Chisholm S and Dekker F. Effects of instruction by practice assistants on inhaler technique and respiratory symptoms of patients. A controlled randomized videotaped intervention study. <i>Family Practice</i> . 1996; 13(1): 35-40.	The intervention involved instruction by a practice assistant and video recording the inhaler's technique which was scored based on nine items. The use of teach-back was not included.
8	Kandula NR, Nsiah-Kumi PA, Makoul G, Sager J, Zei CP, Glass S, Stephens Q, Baker DW. The relationship between health literacy and knowledge improvement after a multimedia type 2 diabetes education program. <i>Patient Educ Couns</i> . 2009 Jun;75(3):321-7.	The intervention was a computer-based program focusing on graphics, animation, spoken audio and on-screen text. The use of teach-back was not included.
9	Loislee A. Schwartz. A Comparison Between Two Types of Preventive Educational Programs for a Population at High Risk for Cardiovascular Disease. Dissertation at Medical College of Virginia-Virginia Commonwealth University, 1988.	Participants were those with elevated HDL ratios, and the outcomes were changes in HDL ratios after intervention. The use of teach-back method was not included.
10	Ivey SL, Tseng W, Kurtovich E, et al. Evaluating a Culturally and Linguistically Competent Health Coach Intervention for Chinese-American Patients With Diabetes. <i>Diabetes Spectrum</i> . 2012; 25(2): 93-102.	Outcome of interest was clinical HbA1C, which was not stated in selected outcomes.
11	Rothman RL, DeWalt DA, Malone R, et al. Influence of Patient Literacy on the Effectiveness of a Primary Care-Based Diabetes Disease Management Program. <i>JAMA: The Journal of the American Medical Association</i> . 2004; 292(14): 1711-6.	Outcomes of interest were HbA1C and blood pressure, which were not stated in selected outcomes.

Appendix V: Overview of included studies

First author, year	Theories use/study design/measured outcomes	Participants information	Intervention/control care/ study details	Length of educational session/follow-up/educator/location	Results
Bosnic-Anticevich SZ, 2010 ³⁵	<p>Theoretical framework: not mentioned</p> <p>Study design: Randomized parallel-group single-blind (n=52, male =19, female =33)</p> <p>Measured outcomes Correct pMDI technique score (maximum score of 8) over 4 visits</p>	<p>Inclusion: patients over 18 years, currently using pressurized metered-dose inhaler (pMDI) for asthma or COPD.</p> <p>Exclusion criteria: first-time pMDI users, those did not self-administer their MDI, those who used spacer.</p>	<p>Standard instruction group: patients received verbal instructions (researcher read all 8 steps of pMDI technique, using illustration in leaflet as visual guide) and written information (product information leaflet).</p> <p>Extended instruction group: patients received verbal instructions, written information and the teach-back method with physical demonstration p MDI with a placebo.</p> <p>Study details: patients were required to visit community pharmacy at least 4 times. Visit 1,</p>	<p>Length of education: not given</p> <p>Follow-up: 4 visits (one visit every 4 weeks) to community pharmacy total duration = 16 weeks</p> <p>Educator: two pharmacy student researchers</p> <p>Location: 8 community pharmacies in Sydney</p>	<p>Inhaler use technique score measured at 4 visits:</p> <p>At visit 1: significant improvement in inhaler technique scores for both groups, p < 0.05</p> <p>Score 8±1 and 8±0 in the control and intervention groups respectively.</p> <p>In the control group: increased scores were significant at visit 4 (scores were not given)</p> <p>In the intervention group: increased scores was significant at visit 2,3,4 (scores were not given)</p>

			patients were taught use of MDI and asked to demonstrate back. In visit 2 and 3, if pMDI technique was incorrect, patient teaching were repeated until correct technique was achieved for a maximum 3 times.		
Davis KK, 2012 ³⁶	<p>Theory: not mentioned</p> <p>Study design: Randomized controlled trial (n = 125, male = 66, female = 59)</p> <p>Measured outcomes:</p> <ul style="list-style-type: none"> - HF self-care index (by SHFCI) - HF knowledge (by the Dutch HF scale) - Thirty-day readmission 	<p>Patients aged 21 and over having primary diagnosis of systolic or diastolic HF and were diagnosed with mild cognitive impairment, anticipated to return to community setting</p> <p>Exclusion criteria: having Alzheimer disease, severe psychiatric illness, neurological condition, stroke, blind, major hearing loss, end-of-life condition, weighted > 350 lb.</p>	<p>Control group (n=62): received a verbal review of the HF booklet (symptoms recognition, exercise, dietary, fluid restriction, medication adherence).</p> <p>Intervention (n=63): delivered during hospitalization, including a workbook (pictograms, self-care schedule, medication schedule, future appointment and symptoms documentation). A case manager was employed to assist patients integrate self-care tasks</p>	<p>Length of educational session: total 44 minutes during hospitalization</p> <p>Follow-up: 30 days follow-up (RCT was conducted during a 12-month period)</p> <p>Educator: the case manager</p> <p>Location: a large academic hospital in America.</p>	<p>HF self-care Maintenance: mean change 14.60 (sd 17.50) vs 13.75 (17.78) at end-point in the intervention and control respectively, p =0.71</p> <p>Management: mean change 7.73 (18.88) vs 3.75 (21.44) at end-point in the intervention and control respectively, p =0.43</p> <p>Confidence: mean change 0.39 (18.41) vs 0.55 (17.86) at end-point in the intervention and control respectively, p =0.69</p> <p>HF knowledge: mean change 0.66 (1.56) vs 0.04 (1.69) at end-point in the intervention and control respectively, p =0.001</p>

			<p>into their daily activities. Patients also participated in a verbal and interactive problem-solving training session with scenarios, which was recorded for patients to review. A post discharge phone call was done 24-72hrs after discharge.</p> <p>Study details: the intervention aimed to improve self-care and knowledge of patients with mild cognitive impairment (mostly Black people). A case manager helped patients to create self-care schedule integrated into daily living. The teach-back method was used in hospital and after discharge to recall knowledge and self-care. Patients were given audiotape recorded scenarios, equipment (audiotape, audio</p>		
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			cassette, scale, measuring cups, pill box...).			
DeWalt 2006 ³⁷	DA	<p>Theoretical framework: not mentioned</p> <p>Randomized controlled trial (n = 123, male = 60, female = 63)</p> <p>Measured outcomes</p> <ul style="list-style-type: none"> - Readmission or death (from patients or medical records) - HF-related quality of life (Minnesota Living with HF Questionnaire) - HF self-efficacy (8-item scale) - HF knowledge (knowledge test used for this trial) - HF behaviors (how often patients weighted themselves) 	<p>Inclusion: patients aged 30– 80 having confirmed diagnosis of HF with New York Heart Association class II-IV especially those with low health literacy</p> <p>Exclusion criteria: patients with dementia (moderate to severe); terminal illness, hearing impairment, blindness, substance abuse, kidney failure or dialysis, going to have heart transplant or surgery</p>	<p>Control group (n=64): usual care plus one HF education pamphlet.</p> <p>Intervention group (n=59): one-hour education using a booklet for low literacy people and a digital scale. Educator used the teach-back to improve comprehension. Educator taught patients to manage weight fluctuation and self-adjust diuretics. Schedule follow-up phone calls were made (days 3, 7, 14, 21, 28, 56) and monthly during month 3-6.</p>	<p>Length of educational session: one hour</p> <p>Follow-up: 12 months</p> <p>Educator: clinical pharmacist or health educator</p> <p>Location: University of North Carolina General Internal Medicine Practice</p> <p>When: regular clinic visit</p>	<p>Hospitalizations:</p> <p>All-cause: adjusted IRR 0.53, 95% CI [0.32, 0.89]</p> <p>Cardiac-cause: adjusted IRR 0.85, 95% CI [0.44, 1.7]</p> <p>Health-related quality of life</p> <p>Mean difference = 2, 95% CI [9, -5], p = 0.59</p> <p>Knowledge:</p> <p>Mean difference = 12% point, 95% CI [6, 18], p < 0.001</p> <p>Self-efficacy:</p> <p>Mean difference – 2 points, 95% CI [0.7, 3.1], p = 0.0026</p> <p>Self-care behaviors:</p> <p>Daily weighing measurement: 79% (intervention) vs 29% (control), p < 0.001</p>

<p>Kiser K, 2012³⁸</p>	<p>Randomized controlled trial (n=99, male = 34, female =65))</p> <p>Measured outcomes MDI, Diskus and Handihaler technique score</p>	<p>Selection criteria: adult patients with diagnosis of COPD, chronic bronchitis, emphysema treated with inhaled medication</p> <p>Excluded criteria: exacerbated COPD or those with asthma only</p>	<p>Intervention (n=67): individual education session, Living with COPD handout, verbal explanation of the handout, teach-back and demonstration of appropriate use of MDI.</p> <p>Control (n=32): received usual care.</p>	<p>Length of education: 15-30 minutes</p> <p>Follow-up: 2-8 weeks</p> <p>Educator: research assistant</p> <p>Location: general internal medicine practice, University of North Carolina</p>	<p>Mean change = 2.1 point, 95% CI [1.1,3.0]</p> <p>Low literacy participants in the intervention vs in the control group: mean difference = 2.8, 95% CI [0.6, 4.9]</p> <p>High literacy participants in the intervention vs in the control group: mean difference = 1.8, 95% CI [0.7, 2.9]</p>
<p>Krumholz HM, 2002³⁹</p>	<p>Theoretical framework: not mentioned</p> <p>Prospective randomized trial n = 88 (male = 50, female = 38)</p> <p>Measured outcomes One-year readmission or mortality</p>	<p>Inclusion: patients aged 50 and over diagnosed with HF.</p> <p>Exclusion: transferred from other hospitals, from nursing home, terminal illness,</p>	<p>Intervention: conducted during hospital discharge; a one-hour education; using a teaching booklet on sequential care domains included illness, medications, deteriorated signs and symptoms. Follow-up phone calls were used periodically during one year for reinforcing care domains and warning signs.</p> <p>Control group: as usual care.</p> <p>The intervention involved two phases. The first</p>	<p>Length educational session: 1 hour</p> <p>Follow-up: 12 months</p> <p>Educator: an experienced cardiac nurse</p> <p>Location: Yale New Haven Hospital, USA</p> <p>When: during 2 weeks of hospital discharge or home visit and follow-up</p>	<p>One-year readmission 56.8% in the intervention and 81.8% in the control group had at least one readmission</p> <p>RR = 0.69, 95% CI [0.52, 0.92], p = 0.03</p>

			<p>phase was conducted in hospital discharge (nurse educated patients using booklet to teach care domains). The second phase was conducted after discharge by using telephone calls during 12-month follow-up. The phone call was aimed at reminding patients of taught knowledge, not to modify or recommend treatment regimens.</p>		
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<p>Negarandeh R, 2011⁴⁰</p>	<p>Theoretical framework: not mentioned</p> <p>Randomized controlled trial (n = 127, male = 69, female = 58)</p> <p>Measured outcomes Knowledge score (a 22-item diabetes questionnaire from 0 - 44 score)</p> <p>Adherence to diet (by a self-structured nine-item from 0-9 score)</p> <p>Adherence to medication using the Morisky Medication Adherence Scale (0 – 8 score)</p>	<p>Inclusion: patients ≥ 18 years old, with type 2 diabetes ≥ 6 months, having low health literacy (≤59 in full TOFHLA instrument), no former participation in diabetes education study.</p> <p>Exclusion: having mental, visual and learning disabilities</p>	<p>Pictorial image (n=44): three weekly 20-minute sessions, provision of pictorial images and information of diabetes-related health care.</p> <p>Teach-back (n=43): three weekly 20-minute sessions, provision of educational content as for pictorial image group, the use of teach-back in teaching and assessing patients' understanding, important instructions were written down.</p> <p>Control (n=40): receive usual care (provision of diabetes-related educational brochure, answering patients' questions).</p>	<p>Length of education: three weekly session, 20 minutes each</p> <p>Follow-up: 6 weeks</p> <p>Educator: a community health nurse</p> <p>Location: a secondary level diabetes clinic in Kurdistan</p>	<p>End-point Knowledge: Mean 29.41 (2.87); 34.65 (2.42); 35.32 (2.12) in the control, the pictorial image and the teach-back group, respectively, p < 0.001</p> <p>End-point adherence to medication: 4.32 (1.58); 6.73 (1.52); 7.03 (0.99) in the control, the pictorial image and the teach-back group, respectively, p < 0.001</p> <p>End-point adherence to dietary: 3.63 (0.99), 5.87 (0.82); 6.15 (0.61) in the control, the pictorial image and the teach-back group, respectively, p < 0.001</p>
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<p>Press V, 2012⁴⁵</p>	<p>Theoretical framework: not mentioned Randomized controlled trial (n = 50, male = 15, female = 35) Measured outcomes Metered dosed Inhaler technique misuse Acute 30-day health-related events</p>	<p>Inclusion: hospitalized patients (aged 18 and over) with asthma or COPD, expect to use MDI post-discharge Exclusion: staying in intensive care, previous study participants.</p>	<p>Teach-to-goal group (n = 24): teach-back plus demonstration of correct use of MDI, written instruction and pamphlet about asthma/COPD. Brief intervention (n = 26): verbal instructions on the use of MDI (no demonstration) and verbal education on the pamphlet about asthma/COPD.</p>	<p>Length of education: mean of 6.3 minutes in the Intervention group vs 2 minutes in control group Follow-up: inhaler technique was assessed right after intervention instruction. Acute health-related events were followed for 30 days post discharge Educator: a trained research educator Location: urban academic center, University of Chicago</p>	<p>Inhaler technique: The control group: misuse 78% vs 46% at pre-test and post-test respectively, p = 0.008 The intervention: misuse 65% vs 13% at pre-test and post-test respectively, p = 0.01 30 day readmission, emergency visit or deaths: If missing participants had no event, the rate was 18% (the intervention 31% vs control 4%, p = 0.024) If missing participants had at least one event, the rate was 40% (the intervention 54% and the control group 25%, p = 0.048).</p>
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<p>Rydman RJ, 1999⁴²</p>	<p>Theoretical framework: not mentioned Prospective randomized controlled trial (n = 68, male = 17, female = 51) Measured outcomes Inhaler technique (breath actuated inhaler BAI and metered dosed inhaler MDI) from 0 - 8 score</p>	<p>Inclusion: asthmatics with 6 months being in pulmonary/asthma clinic Exclusion: missed more than 25% appointments in 6 last months, had previous ED visit, took more than 10mg oral prednisone, unable to read or understand English</p>	<p>I (n=36): verbal instruction, demonstration of breath actual inhaler technique, teach-back, autohaler package insert instruction. C (n=32): autohaler package insert instruction, patients demonstrated inhaler technique with no feedback. Intervention participants were instructed to use inhaler, then were given feedback and repeated education until proper inhalation technique was achieved. MDI might be alternative for BAI. In end of program, patient demonstrated back to a physician, and again received instruction on correct use of BAI and MDI.</p>	<p>Length of education: not given Follow-up: 8-20 weeks Educator: a trained instructor Location: asthma clinic of Cook County Hospital, USA</p>	<p>Inhaler technique score from baseline to end-point: Those using the breath-actuated inhaler BAI: The intervention group: mean difference - 0.28 (sd 0.45), p = 0.005 The control group: mean difference = 0.03 (0.57), p = 0.74 Those using the meter-dosed inhaler MDI: The intervention group: mean difference + 0.4 (0.7), p = 0.009 The control group: mean difference 0.41 (0.68), p = 0.002</p>
<p>Swavely D,</p>	<p>Theoretical</p>	<p>Inclusion criteria:</p>	<p>Intervention included</p>	<p>Length of educational</p>	<p>Diabetes knowledge: 84% vs 40.7 %</p>

<p>2013⁴³</p>	<p>framework: not mentioned Before-After study (n = 277, male = 94, female = 183) Measured outcomes Diabetics knowledge (>=80% correct answers in Spoken Knowledge in Low Literacy in Diabetes. Self-care Self-efficacy HbA1C level</p>	<p>patients aged 18 and over; diagnosed with type 2 diabetes</p>	<p>teaching about human body and disease, using map visuals, cues, questions, discussion cards, group interaction, and facilitation to empower patients to be responsible for taking themselves. Patients also have a one-hour individual session with dietitian and pharmacist to work on diet and medication. Patients and their previous physician were provided targets and goals in communication, care coordination, and assistance in doing self-care activities. Staff received education related to intervention (health literacy, communication, cultural tailoring, the teach-back method...) to be educator. The program is</p>	<p>program: consisted of 13 educational hours lasting over 12 weeks. Follow-up: 12 months Educator: staff experienced in providing diabetes education and a dietitian and pharmacist Location: from 6 primary care medical practices, USA</p>	<p>patients scoring 80% or higher correct answers (p < 0.001) Self-care: number of days per week they followed recommended diet, exercise, foot care regimens</p>
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			aimed at improving self-efficacy		
White M, 2013 ⁴⁴	<p>Conceptual model: the teach-back method</p> <p>Cohort n =276 (male = 123, female = 153)</p> <p>Measured outcomes:</p> <ul style="list-style-type: none"> - 7 day post-discharge knowledge retention (answered correctly at least 75% teach-back questions) - 30-day hospital readmission 	<p>Inclusion: patients aged 65 and over with primary or secondary diagnosis of HF.</p> <p>Exclusion: participants with severe cognitive impairment and severe dementia</p>	<p>Intervention was conducted as usual care. The intervention included handouts adapted from America Heart Association guideline, provision of weighing scale in hospital and included family member and caregivers if possible.</p> <p>Intervention included rationale for fluid and salt restriction, adherence to medication, daily weighing, quit smoking, warning signs and activities. 188/276 participants received intervention at home.</p> <p>Knowledge was assessed within 7 days post discharge and if patients answered incorrectly, education was repeated until correct answers</p>	<p>Length of education: average 34 minutes (ranging 15-120 minutes)</p> <p>Follow-up: 7 days for knowledge retention, 90 days for hospital readmission and 15 months for deaths</p> <p>Educator: two registered nurses</p> <p>Location: cardiology and medical services at University of California, USA</p>	<p>Knowledge retention: 84.4% answered correctly during hospitalization, 77.1% during follow-up.</p> <p>Readmission</p> <p>30-day readmission: 14.9% readmitted HF 30-day readmission: 3.3%</p>

			<p>were achieved. Hospital readmission and death number were tracked in 90 days and 15 months respectively.</p>		
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Appendix VI: JBI Grades of Recommendation

JBI Grades of Recommendation	
Grade A	A 'strong' recommendation for a certain health management strategy where (1) it is clear that desirable effects outweigh undesirable effects of the strategy; (2) where there is evidence of adequate quality supporting its use; (3) there is a benefit or no impact on resource use, and (4) values, preferences and the patient experience have been taken into account.
Grade B	A 'weak' recommendation for a certain health management strategy where (1) desirable effects appear to outweigh undesirable effects of the strategy, although this is not as clear; (2) where there is evidence supporting its use, although this may not be of high quality; (3) there is a benefit, no impact or minimal impact on resource use, and (4) values, preferences and the patient experience may or may not have been taken into account.