Use of Teach-Back Methodology to Promote Self-management and Treatment Adherence in Children With Chronic Illness: a Systematic Review and Meta-analysis Protocol

Patrick McCrossan (✉ p.mccrossan@qub.ac.uk)

Queen's University Belfast School of Medicine Dentistry and Biomedical Sciences

https://orcid.org/0000-0001-5242-4866

Kathryn Ferris

Queen's University Belfast

Michael Shields

Queen's University Belfast

Dara O'Donoghue

Queen's University Belfast

Protocol

Abstract

Introduction Chronic disease in childhood is becoming more prevalent worldwide. Self-management skills can only be taught with effective communication between the health care worker and the patient or primary care provider. 'Teach-back' is one proposed method for providing this education which has yielded success in adult populations but is not yet fully employed in the paediatric setting.

Aims To determine whether the 'teach-back' technique is effective and feasible at all levels of care (primary, secondary and tertiary) to improve the self-management skills and knowledge required for a young person, or their parent/guardian, to control their chronic illness.

Methods We have developed a protocol for a systematic review and meta-analyses in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) statement and have registered it with Prospero [CRD42021229025].

Background

The prevalence of chronic illness in children is on the rise with a reported 1 in 5 children suffering from a disease that affects their daily function in the USA (1). There are associated financial implications with chronic illnesses accounting for 10% of hospital admissions and 40% of inpatient healthcare costs (2). Chronic illness is a significant family stressor that puts the child at risk for both emotional and behavioral problems as well as interfering with adherence to treatment regimens (3). Better quality paediatric healthcare can translate into improved quality of life in later life by reducing rates of disability, improving educational achievement and optimising employment prospects in adulthood (4).

Self-management strategies support children and their their families to understand and manage their own chronic disease by supporting behavior change and treatment compliance (5). They can optimise health and well-being for the individual by providing an action plan that is both agreed and understood and serves as a roadmap in the event of a child having a disease exacerbation (6). In addition, self-management improves health outcomes by improving adherence to the treatment and building the patient's capacity to navigate challenges and problem-solve (7). Self-management support models are not well developed for children and adolescents with complex chronic conditions, and as a result, self-management support is rarely integrated into paediatric care (8).

Adherence to treatment plans is a key part of self-management in children with chronic illness. Many reasons for medication non-compliance have been cited, including poor communication and complicated or difficult-to-use treatment regimes. Personalised health education can provide children and adolescents with the knowledge they need about their condition to manage it effectively (9). There has been a call for stakeholders in paediatric health care to develop evidence-based interventions to improve self-management but it is presently unclear what the most effective methods are (10) .

Asthma is the most common chronic paediatric illness (11), and correct inhaler technique with a personalised action plan are integral to effective self management. It is recognised that the majority of patients do not use their inhaler correctly. This may reflect poor communication from the healthcare professional, a lack of understanding on the part of the child or guardian, knowledge decay over time or a combination of one or more of these factors (12). The importance of good inhaler technique is reflected in clinical guidelines for asthma. The British Thoracic Society (BTS), Global Initiative for Asthma (GINA) and the National Institute for Health and Care Excellence (NICE) refer to the importance of assessing inhaler technique as having a fundamental role in asthma self management. However, none of the guidelines outline how to improve or teach the skill of using an inhaler. GINA suggest that the clinician should 'compare with a device specific checklist (13).' BTS state that a physician should, 'prescribe inhaler only after patients have received training in the use of the device and have demonstrated satisfactory technique (14).' Lastly, NICE specifically mention methods of teaching inhaler technique as an area in need of future research (15).

Insulin dependent diabetes mellitus is another example of a chronic childhood illness which requires co-ordinated self-management to ensure good disease control. With regards insulin injection, younger children (aged 7-9 years of age) only perform about 50% of the technique correctly. While this improves with age, even older children and adolescents (aged 13-18) still only perform 70% of skills correctly (16). It is recognised that an evidence-based educational approach to teaching the technique of insulin injection would likely improve patient adherence and outcomes. However, there is no clear guidance on how this could be achieved in a standardised manner (17).

It is clear that interventions targeting methods of communication are required to improve the transfer of knowledge and skills from health care workers to patients when educating them on self-managment'Teach-Back' (TB) is one proposed method of providing this education which has yielded success in adult populations (18). The term 'Teach Back' describes a process of communicating health information, whereby following instruction, the patient explains or 'shows back' key points or steps to the healthcare worker (HCW). This is repeated until the HCW judges that this has been done well, thereby ensuring both knowledge recall and understanding (19). Thereby, Teach-Back may also be referred to as 'closing the loop,' or 'closing the cycle' (18).

The principle underlying the effectiveness of the TB method appears to be based on two key educational processes that contribute to knowledge and skills improvement: information retrieval and feedback. Cognitive behavioural and educational theory supports this. It is recognised that re-testing and retrieval, as demonstrated by Teach-Back are important to consolidate learning (20). It is proposed that study and testing form separate memories and that this aids retrieval and long-term retention (21). The provision of feedback helps to expedite and close the learning cycle (22).

A recent systematic review of the implementation of TB in adults, concluded that strategies to support its use into practice are often poorly described and advised that there should be improved training and education of HCW's to implement its use in clinical practice (23). Although no standardised method of

deliverng TB has been agreed, a TB framework (The 5Ts for Teach Back) has been reported and successfully implemented to train more than 1300 HCW's to use TB when delivering any type of information to patients (19).

This educational intervention should be transferable to a wide range of medical conditions. TB has been used to improve the health behaviours of patients with diabetes and heart failure (24). Use of TB has been shown to improve knowledge, skills and self-management proficiencies in adults with chronic disease (25) (26) (27) (28). A recent systematic review on the TB method of education in adults, suggests that the technique may be beneficial in reinforcing patient education (29).

As all of the above studies were conducted in adult populations, it is important to determine if TB promotes self-management and treatment adherence in children and young people with chronic disease. A systematic review of self-management interventions for young people with physical disbalities concluded that there are relatively few rigorously designed studies and that more research is required to document the most effective methods (30).

It is likely that TB can be used to improve the self-management skills and knowledge required for a young person, or their parent/guardian, to control their chronic illness. We have designed a systematic review of the use of TB to promote self management and treatment adherence in childhood chronic illness. The aim is to determine whether these techniques are effective and feasible in all levels of care (primary, secondary and tertiary) by completing a meta-analysis. As asthma is the most common childhood chronic illness, we plan to perform a subgroup analyses of TB use in teaching inhaler technique and providing patients understanding of their asthma action plans.

Methods

A systematic review and meta-analysis of the use of TB in paediatric patients with a chronic illness, to teach the skills required for self-management and treatment adherence compared with a controlled group.

We have developed this protocol in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) (31) statement and have registered it with Prospero [CRD42021229025].

Eligibility criteria

Type of participants

This review will include only studies that involved children (less than 18 years of age) in any healthcare setting (community, primary,secondary or tertiary care). Included study participants were those with any chronic disease including (but not exclusively); asthma, allergy, diabetes and epilepsy.

Types of intervention

Eligible studies are those which reported on the use of the Teach-Back method to educate patients on any aspect of the self-management of their disease. The intervention could be delivered by any healthcare worker. The comparator was any educational method that did not involve Teach-Back.

Types of studies

This review will consider quantatative studies including randomised control trials (RCT's), quasi-experimental studies and observational studies that evaluated the effect of Teach-Back. All publications up until February 2021 will be included. Non-english plublications will be excluded.

Types of outcomes

Selected outcomes will be disease specific self-management skill acquisiton, treatment adherence and disease specific knowledge.

Information sources and search strategy

Under the guidance of the Queen's University Belfast medical librarian, a search strategy will be developed and performed electronically. We will include a range of terms and keywords related to the research question, such as: "teach-back", "teach-to-goal", "closing the loop", "closing the cycle", "repeated instruction", "children" and "paediatrics." To maximise the potential of all potential literature being captured by the search, the following digital databases will be used: Medline, Embase, Web of Science, Scopus, CINAHL, and the Cochrane Library, along with eligible publications sourced from the citations within papers elicited from the search. If a full-text publication, which meets the eligibility criteria is not available then contact will be made with the study author to request access.

Data collection and analysis

Data management

EndnoteX9^{TM} will be the reference management system used to save the results from each online search. Separate files for each online database will be kept and then all results will be imported into one library. At this point, all duplicates will be removed. All results will then be exported onto a Microsoft Excel^{TM} file. During the screening and selection process, documentation will be recorded on Microsoft Excel^{TM}.

Screening

We will screen each of the studies by title and abstract to ensure they fit the eligibility criteria. Titles and or abstracts which clearly fit the criteria will be brought forward for full text analysis. Studies which do not fit the eligibility criteria will be reviewed by a second independent reviewer before excluding them from further analysis. Those studies which have been deemed to fit the eligibility criteria as per title and abstract will be brought forward for full text analysis. In the event that a full text article is not available or that there is insufficient data within the publication we will contact the author to try to obtain the data.

Once all full text articles are available, the papers will be reviewed by each member of the research team to ensure they meet eligibility criteria. During this review process, any articles which are deemed relevant from the references of included studies will be screened in the same process as described above and considered for inclusion.

Data extraction

A draft data extraction table will be created and then piloted by two members of the research team independently. This will allow for iterative changes to ensure we have captured all of the relevant information. Any disagreements will be resolved by consensus between all four members of the research team. Amendments made will be noted and documented before a final data extraction table is decided upon.

Data Items

Information will be extracted from each included trial regarding 1. The participants' chronic disease type 2. The skill/knowledge under investigation and 3. A measure of the effect size that the TB educational intervention had on this skill/knowledge. These have been prioritised in order to best answer the research question which is whether the use of TB methodology is effective in teaching children and/or their carers to self-manage their chronic disease.

Risk of bias in individual studies

The development and registration of this protocol in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocol (PRISMA-P) (31) statement will help protect from reporting bias. Using two independent reviewers to screen the articles will aid with selection bias along with two further independent reviewers to aid with ambiguous cases. Ideally, the articles would be masked by author and institution. However a consensus was achieved, and this was deemed unnecessary. By accepting only peer-reviewed published studies, we accept a potential for evidence selection bias. This bias is difficult to overcome, as to answer the research question, we need to review studies which have reported outcomes with a statistical measure of effect size. We will report the methods used to assess the risk of bias in each included study and we will use the Cochrane Collaboration's tool for assessing risk of bias (32). The quality of evidence will be evaluated by all four

reviewers using the 'Grading of Recommendations Assessment, Development and Evaluation' (GRADE) approach (33). There are no competing interests from the research team to report in performing this systematic review.

Data synthesis and meta-analysis

To test for heterogeneity in the quantitative data, we will use the I2 test, taking an I2 of > 75% as being high heterogeneity

Using the main outcomes of effect size of change in desired skill/knowledge, if appropriate, a meta-analysis will be performed using a random-effects model, with the difference between means (for continuous data) and the odds ratio (for categorical data) calculated as the principal summary measure. These findings will be illustrated using a forest plot based on 95% confidence intervals. StatsDirect v 3.34, (StatsDirect Limited, www.statsdirect.com) will be used to analyse the data.

Where statistical pooling is not possible, the findings will be presented in a narrative form.

Sub-group analysis looking at asthma patients will be carried out to explore the effectiveness of Teach-Back as an educational intervention for asthma self-management in children (in particular, adherence to inhaled medications, inhaler technique and understanding of personalised asthma action plans).

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availabilty of data and materials

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

Competeing interests

The authors declare that they have no competing interests

Acknowledgements

Not applicable

Contribution of authors

The concept for the research question was devised by DO and MS. This protocol was designed by PM who will act as guarantor for the paper. KF will perform the search and initial screening of title and abstracts whilst PM, DO and MS will act as reviewers of the extracted articles. PM and MS designed the meta-analyses methodology. DO will act as gurantor of the study.

Support

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