Increasing the frequency of physical activity very brief advice for cancer patients. Development of an intervention using the Behaviour Change Wheel.

Abstract:

Background

Being physically active has multiple benefits for cancer patients. Despite this only 23% are active to the national recommendations and 31% are completely inactive.

A cancer diagnosis offers a teachable moment in which patients might be more receptive to lifestyle changes. Nurses are well placed to offer physical activity advice however, only 9% of UK nurses involved in cancer care talk to all cancer patients about physical activity.

A change in the behaviour of nurses is needed to routinely deliver physical activity advice to cancer patients. As recommended by the Medical Research Council, behavioural change interventions should be evidenced-based and use a relevant and coherent theoretical framework to stand the best chance of success.

Objective

This paper presents a case study on the development of an intervention to improve the frequency of delivery of very brief advice (VBA) on physical activity by nurses to cancer patients, using the Behaviour Change Wheel (BCW).

Method

The eight composite steps outlined by the BCW guided the intervention development process. An iterative approach was taken involving key stakeholders (n=45), with four iterations completed in total. This was not defined *a priori* but emerged during the development process.

Results

A 60 minute training intervention, delivered in either a face-to-face or online setting, with follow up at eight weeks, was designed to improve the capability, opportunity and motivation of nurses to deliver VBA on physical activity to people living with cancer. This intervention incorporates seven behaviour change techniques of goal setting coupled with commitment; instructions on how to perform the behaviour; salience of the consequences of delivering VBA; a demonstration on how to give VBA, all delivered via a credible source with objects added to the environment to support behavioural change.

Conclusion

The BCW is a time consuming process, however it provides a useful and comprehensive framework for intervention development and greater control over intervention replication and evaluation.

Introduction:

Leading a physically active lifestyle reduces people's risk of developing some cancers.[1] An estimated 3,400 people each year in the UK could avoid being diagnosed with cancer by being physically active to recommended levels.[2]

It is less well known that being physically active has multiple benefits for cancer patients including slowed disease progression, improved survival and reduced recurrence.[3,4] Physical activity helps cancer patients maintain physical condition,[5] improve their quality of life[6] and reduce the consequences of cancer treatments, such as fatigue and psychological distress.[4] Being physically active reduces the risk, and helps management of comorbidities[7] of which 47% of cancer patients have at least one.[7]

Performing physical activity is safe both during and after most cancer treatments.[8] The American College of Sports Medicine (2010)[8] advise cancer patients to avoid inactivity and return to normal daily activities, as soon as possible after surgery and during cancer treatments.

The standard age appropriate guidelines apply[5,8,9] however only 23% of cancer patients in England are active to recommended levels and 31% are completely inactive.[6] A dose response relationship has been reported[10] meaning that even small improvements in physical activity can have a positive impact.

A US survey[11] suggests that lifestyle advice is of interest to 80% of cancer patients. In the UK, it has been reported that cancer patients and their closest supporters think lifestyle advice would be beneficial and would prefer such advice from a trusted healthcare professional.[12,13] It is important that healthcare staff do not give conflicting messages, as this could hinder successful behavioural change.[14]

The teachable moment

A cancer diagnosis may offer a 'teachable moment' in which patients are more receptive to changing lifestyle behaviours.[15-18] These 'teachable moments' however, will not bring about a change in behaviour on their own; they need to be deliberately created as part of the patient consultation.[19]

The 'teachable moment' follows a health event that produces significant health concern.[16,20] To motivate a change in behaviour, this event must increase perceived vulnerability to a

health treat that changing behaviour can address; be associated with positive or negative emotions that increase the meaningfulness of the event and test ones self-concept and social role.[16] A cancer diagnosis and a change in physical activity behaviour could satisfy these criteria.

The National Institute of Health and Care Excellence (NICE) recommends that health, wellbeing and social care staff should be encouraged to deliver very brief advice (VBA), advice given in less than two minutes, to motivate people to make a lifestyle change.[21] A simple recommendation to be more physically active from a healthcare professional to a cancer patient, with onward referral to an appropriately qualified physical activity professional or group, or signposting to user-friendly self-help brochures, has been suggested to support changes in behaviour.[5] NICE call for more research in this area.[22]

Clinical nurse specialists and practice nurses are well placed to offer physical activity advice to cancer patients during their many interactions throughout treatment and observation.[23] Eighty nine percent of patients have a named clinical nurse specialist in charge of their care[24] and practice nurses play a key role during followed-up. Nurses often see the same patients many times and can build a strong relationship meaning patients may be more receptive to their advice.[25]

Nurses are more likely to discuss changes in lifestyle behaviour than any other healthcare professional,[26] however there is a gap in their knowledge[14,27,28] calling for better education and training.

Awareness of the benefits amongst nurses

Despite the evidence to support the benefits of physical activity for cancer patients, awareness of these benefits amongst nurses is not universal. A survey commissioned by Macmillan Cancer Support (2011)[29] shows that 28% of nurses do not think that discussing physical activity is of critical importance; 41.5% of nurses are unaware of the guidelines for physical activity and only 9% talk to all of their cancer patients about the benefits of physical activity.[29]

To support a change in the physical activity behaviours of cancer patients, nurse practitioners must change their practice to routinely delivery physical activity advice.[30]

Theory based intervention design

The Medical Research Council recommends that interventions are based on a relevant and coherent theoretical framework.[31]

Incorporating a relevant theory when developing behaviour change interventions makes it more likely that people will change their behaviour, or change their behaviour to a greater extent.[32]

The NICE guidance[21] on individual approaches to behaviour change sets out that behaviour comes about from an interaction between one's 'capability' to perform a behaviour, and the 'opportunity' and 'motivation' to carry out that behaviour. A new behaviour or behavioural change requires a change in one or more of these components. This theory is know as the COM-B model.[33]

Glanz (2008)[34] suggests that selection of a appropriate theory should be logical, supported by past research and used in similar programmes. The COM-B model offers a logical approach to behaviour change and has been used previously to design interventions to change the practice of healthcare professionals.[35,36]

Many frameworks exist upon which behaviour change interventions can be based, however it is not clear which is the most comprehensive and conceptually coherent.[33] The Behaviour Change Wheel (BCW)[33] aims to overcome this problem and synthesises 19 behaviour change frameworks with the COM-B model sitting at its centre.

The BCW guide to designing interventions[37] provides an evidenced based stepped approach to changing behaviours encouraging intervention designers to consider a full range of options, choosing only those that are most promising. A behavioural diagnosis is made using the COM-B model with up to nine intervention functions available for selection based upon the identified COM-B components. In turn, policy categories are selected based upon the identified intervention functions, with up to seven available. Finally, behaviour change techniques (BCTs) are selected from the Behaviour Change Technique Taxonomy version 1 (BCTTv1).[38] This paper discusses the development of an intervention using the BCW to improve the frequency of delivery of VBA on physical activity by nurses to cancer patients.

Method:

The BCW follows eight steps towards intervention design.[37] Steps one to three help intervention designers identify a specific behaviour to change.

The importance of front line nursing staff providing physical activity advice to people living with cancer, to bring about a change in their physical activity behaviour is clear[15-18, 23, 39] and is the focus of this intervention. Therefore, it was not necessary to complete steps one to three of the BCW in this instance.

The remaining steps of the BCW (four through eight) are as follows:-

4. Identifying what needs to change using the COM-B model.
5. Selection of relevant intervention functions from the list of education; persuasion; incentivisation; coercion; training; restriction; environmental restructuring; modelling and enablement; based upon an evaluation of their affordability, practicability, effectiveness, acceptability, side effects and safety, and equity (APEASE).
6. Selection of relevant policy categories to support the delivery of the identified intervention functions based upon an evaluation against the APEASE criteria.
7. Selection of BCTs from the BCTTv1,[38] based upon an evaluation against the APEASE criteria.
8. Selection of the mode(s) of delivery, based upon an evaluation against the APEASE criteria and confirmation of the intervention content.

A through review of the evidence was completed prior to intervention development using the Cochrane, Pubmed, CINAHL Plus, TRIP, Scopus, ERIC, Centre for Reviews and Dissemination and Google Scholar databases. NICE and World Health Organisation guidance sites were also searched.

A search strategy was developed using free text and subject headings relating to the areas of delivery of physical activity advice to cancer patients; barriers to physical activity promotion by healthcare professionals; the education and training of healthcare professionals; the changing of professional practice and the use of VBA to improve adoption of healthy lifestyle behaviours. Following a title and abstract review, 40 papers were identified as relevant to support the intervention development process and were reviewed in full by the lead researcher (JW).

An iterative approach was taken to intervention design, guided by the steps of the BCW. This was not defined *a priori* but emerged during the development process. Four iterations were completed in total with the intervention developed throughout.

First iteration

The lead researcher (JW) completed a run through of steps four to eight of the BCW to create an outline of an intervention.

Second iteration

A small development group of experts in physical activity and cancer (n=4) from Macmillan Cancer Support was convened to review the results of the first iteration. Steps four to eight of the BCW were completed again over one, four-hour session.

Third iteration

The development group was expanded to include professionals involved within cancer care (n=4) and behaviour change (n=1). Steps four to eight of the BCW were completed once more over four, one-hour sessions.

Fourth iteration

Researchers JW, JF and EP developed the final intervention content. This was presented to representatives from the proposed target audience of practice nurses (n=9) and clinical nurse specialists (n=24). In addition, comments on the intervention were sought from two cancer patient representatives and a professional specialising in nursing education. This was completed across four, one-hour sessions.

Results:

Behavioural diagnosis

A behavioural diagnosis, using the COM-B model, was made based upon the existing literature,[13,25,40-42] evidence statements from NICE (2013),[22] and from a survey commissioned by Macmillan Cancer Support (2011).[29] The behavioural diagnosis is presented in Table 1, outlining the capability, opportunity and motivational factors that need to be considered to bring about a change in nursing practice.

Intervention functions

These COM-B components were mapped to the nine intervention functions identified within the BCW with all nine available for selection. The intervention functions of incentivisation, restriction and coercion were excluded, as they did not meet all of the APEASE criteria. The functions of education; training; environmental restructuring; modelling; persuasion and enablement were selected. Details of the evaluation of each intervention function against the APEASE criteria are provided in Table 2.

Policy categories

These six intervention functions were subsequently mapped to the policy categories identified within the BCW, with all policy categories identified as available for selection. The policy categories of fiscal measures, regulation, legislation, and environmental and social planning were excluded for not meeting the APEASE criteria. Communications and marketing, and use of relevant guidelines were selected to support delivery of this training service. Details of the evaluation of each policy category against the APEASE criteria are provided in Table 3.

Marketing communications and media campaigns generate awareness and can even lead to changes in weakly held attitudes.[43] Communications and marketing can also influence organisational practice by communicating a vision for change.[44] This is important as having the support of the workplace to encourage the delivery of physical activity advice to cancer patients was identified within the behavioural diagnosis.

Also identified within the behavioural diagnosis was a lack of awareness of the guidelines for physical activity for cancer patients,[13,40] therefore, awareness should be drawn to such guidelines.[5,8,9]

Behaviour change techniques

The BCW guide[37] identifies the most frequently used BCTs for each intervention function from the BCTTv1.[38] Five BCTs met the APEASE criteria and were selected. A review of the full 93 item BCTTv1[38] identified two additional BCTs of 'commitment' and 'salience of consequences' which also met the APEASE criteria. The selected seven BCTs and their definitions are presented in Table 4.

Implementation of each of the selected BCTs is discussed below.

Credible source

It has been suggested that external 'change agents', defined as agencies or individuals that promote change from outside an organisation,[45] could be effective in diffusing an innovation and aiding adoption. A UK study identified that 30% of cancer care professional who are aware of the lifestyle guidelines for cancer patients, obtained this information from Macmillan Cancer Support.[13] This was more than for any other body with 23% turning to national guidelines from NICE or the Department of Health and 7% from other bodies.[13] Therefore, Macmillan Cancer Support is well placed to play the role of an external 'change agent'.

Salience of consequence

The evidence on the benefits of physical activity to cancer patients will be presented to the nurse participants, as will the evidence on the effectiveness of advice from a trusted healthcare professional in changing behaviours. This is to be supported by a video of a cancer patient discussing

Instructions on how to perform the behaviour

VBA follows an 'ask, advise, act (or assist)' structure.[21,46] NICE (2007)[47] suggest that reminder systems are among the more effective methods for changing behaviour. The 'ask, advise, act' framework can be considered a reminder system and may be familiar to nurses already from its use in smoking cessation[46] thus enabling elaborative encoding.[48]

Whilst this intervention aims to change the behaviour of nurses to deliver VBA, the content and language used in the delivery of VBA to cancer patients is indeed a behaviour change intervention in itself. The BCTs used in delivery of VBA were selected from the CALO-RE taxonomy,[49] a specific taxonomy of BCTs to help people change their physical activity and healthy eating behaviours. The structure of the 'ask, advise, act' intervention, including details of the selected BCTs is described in Table 5. Delivery in this way aims to capitalising upon the 'teachable moment'[16,20] by helping cancer patients understand the benefits of being physically active specific to their condition; improving attitudes and motivations towards

physical activity and enhancing control to enable action. Script cards will present instructions to the nurse participants on how to deliver advice in this way (see additional file 1).

Demonstration of the behaviour

An audio clip of the behaviour in action will be played to the nurse participants.

Adding objects to the environment

In addition to receiving a script card, the nurse participants will also receive an 'ask, advise, act' coaster to prompt delivery of VBA on a daily basis (see additional file 2).

Goal setting (behaviour) coupled with commitment

At the end of the training intervention the nurse participants will be encouraged to set themselves up to three goals using the term 'I will'. These will be sent back to the nurse participants eight weeks post intervention for self-review.
how being physically activity has improved their quality of life.

Mode of delivery

Face-to-face and online training were selected as appropriate modes of delivery for this intervention as they are familiar to nurses,[30,50,51] have been shown to be effective[51] and met the APEASE criteria. Interpersonal communication is important during the adoption of behaviours[52] therefore online seminar technology will be used for online delivery allowing real-time interpersonal communication.[53]

It is understood that different learning styles are common and variable learning is likely to be more effective.[54] The proposed syllabus covers the seven learning styles identified by Whiteley (2003)[55] of visual, audio, verbal, physical, logical, solitary (online only) and social learning.

In recognition of the limited time that nurses have given their high work demands, a pragmatic approach was taken to training delivery time. The training intervention will be delivered in one contact over 60 minutes, which will fit within most meeting time allocations.[56]

Final intervention

The final intervention content includes information on the importance of physical activity for cancer patients;[3,4] physical activity guidelines;[5,8,9] the reported physical activity levels of cancer patients;[6,57-59] the impact of sedentary behaviour on health;[60,61] details of the

‘teachable moment’ and the impact of advice from a trusted health care professional on lifestyle behaviour;[15,17,18,21,62] and details of where to signpost for more help and support.[63-65] The full training intervention content is outlined in Table 6.

Discussion:

The BCW provided a useful framework for intervention design, encouraging the use of both judgement and the best available evidence.

The process of using the BCW was time consuming. Whilst the BCW tries to restrict the available intervention functions based upon the COM-B diagnosis, and then the policy categories based upon the intervention functions, in this case, all intervention functions and all policy categories were available for selection. Whilst the BCW guide[37] suggests the most frequently used BCTs for each intervention function, a full review of the 93 item taxonomy[38] identified two additional relevant BCTs that would have otherwise been missed.

The combination of nine intervention functions, seven policy categories and 93 BCTs is a comprehensive framework, however the volume of choice was at times overwhelming. There was a feeling of wanting to include everything rather than refine the intervention to ensure that it was highly targeted and specific.

Developing interventions is a complex task. The strength of the BCW is that it provides a systematic process to intervention design. A thorough understanding of the BCW was needed by the research team to guide members of the development group through the process at each stage. In total, 45 people were involved in the development of the intervention each committing between one and eight hours of their time. This does not include the time given by the research team, which was substantially more. This is a large amount of person hours.

It is unclear as to the extent that the BCW can design successful interventions however, the coding of the BCTs used will improve replicability and aid evaluation.

Nurses, across all disciplines, have a responsibility to promote positive health behaviour change in patients, their families, carers and the wider community.[66-68] What is less evident is the consequent need to provide training and support to enable nurses to achieve this. It is clear from the literature that there is a need for better training to educate nurses in the importance of physical activity for cancer patients[14,27,28] and how to deliver advice in the time they have available. This intervention aims to fill this gap.

It is identified in the behavioural diagnosis that gaining the support of the workplace is important to facilitate delivery of VBA. This must be considered when rolling out an intervention of this kind.

It is possible that early adopters of this intervention could act as role models to their peers, increasing the opportunities for observational learning.[69] The face-to-face intervention is more likely to modify the behaviour of multiple nurses within the same organisation increasing the chances of creating a 'social norm' and as such 'social opportunities'.[33]

It is important to understand how the intervention fits within daily practice; which characteristics of the intervention resonate and the role of the change agent and credible source.[45] A feasibility study to test the acceptability, practicability and implementation of this intervention is on-going. If the intervention is deemed feasible, then a pilot trial to review its long-term effectiveness on VBA delivery and the consequent effect of VBA on the physical activity levels of cancer patients is advised. If this intervention is shown to be successful in changing the practice of nurses then this will support the future use of the COM-B model and the BCW framework to design interventions to change the practice of healthcare professionals.

The characteristics of successful innovations, as identified by Rogers (1995)[45] are met by this intervention. They are its potential compatibility with current practice; the possible improvements to current practice in bettering patient outcomes; the simplicity and adaptability of VBA; the observability of results and that it can be considered low risk.

There is the potential to expand this intervention to a wider group of healthcare professionals involved within cancer care such as oncologist, radiologist, dieticians, speech and language therapists, physiotherapists, occupational therapists and those working in primary care such as GPs, healthcare assistants and community nurses. If the behavioural diagnosis can be confirmed for these groups then the intervention can be deemed to be feasible for these audiences.

There is the potential to adapt this intervention to encourage physical activity in other long-term condition patients by healthcare professional. Again, if the behavioural diagnosis can be confirmed, the structure of the intervention, the selected intervention functions, policy categories, BCTs and modes of delivery could be deemed feasible, with changes made to the intervention content. Further, if the behavioural diagnosis can be confirmed for delivery of physical activity advice by healthcare professionals to those identified as inactive within the general population, then the intervention structure could again be deemed feasible, with changes made to the intervention content. In this instance however, the suggested 'teachable moment'[16,20] might not be present and therefore changes might be less likely to occur in the physical activity behaviours of those in receipt of advice.

Conclusion:

A behavioural modification intervention has been designed, guided by the BCW,[33] to change the practice of nurses in the delivery of VBA on physical activity to cancer patients. This in turn aims to increase cancer patient levels of physical activity.

The BCW is a time consuming process and the volume of choice can be overwhelming, however it provides a useful and comprehensive framework for intervention design. The coding of BCTs will improve the replicability of the intervention and will assist in its evaluation.

An iterative approach was taken to intervention design that was not defined *a priori.* The intervention became more defined and targeted with each iteration. Four iterations were completed involving multiple stakeholders before a final design was agreed upon. It is not known how this will compare to the design of other behaviour change interventions using the BCW.

A feasibility study to confirm ‘can it work?’ is on going.

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