**Behaviourally focussed approaches to recruitment and retention in clinical trials: a systematic mapping review**

**Introduction**

Well-designed clinical trials are the backbone of evidence-based medicine, but even the most thoroughly considered trial is prone to problems with recruitment and/or retention (Brueton et al., 2013; Treweek et al., 2018). The consequences of poor recruitment range from the financial burdens of extending study deadlines to meet goals through to larger issues of failing to attain proper statistical power of a potentially efficacious intervention (Kitterman, Cheng, Dilts, & Orwoll, 2011; Treweek et al., 2018). This raises the risk that a potentially effective treatment or intervention will be abandoned (Treweek et al., 2018). Even if the treatment or intervention remains in active research, there would be a significant delay in it reaching practice due to the further trials or meta-analyses needed to establish its safety and efficacy (Treweek et al., 2018). There is also an inherent ethical dilemma for trialists when they fail to recruit to targets. They have exposed participants to an intervention but cannot speak reliably to its benefit or harm, which is again compounded if the intervention moves to repeat trials (Treweek et al., 2018). In terms of retention, around 50% of trials experience a loss to follow up of at least 11% with some as high as 20% (Walsh, Devereaux, & Sackett, 2015). Not only is the financial and resource cost burdensome to replace these lost participants, but it also throws the results of the trial into question due to the loss of data from these non-completers (Akl et al., 2012; Walsh et al., 2014). The generalizability and internal validity of a trial are at risk from differential loss to follow-up as it introduces bias that can skew effects towards one group or another (Akl et al., 2012; Brueton et al., 2013).

Key stakeholders in clinical trials units (CTUs) throughout the UK have identified recruitment and retention as top priorities to be addressed by trials methodology researchers (Tudur Smith, Hickey, Clarke, Blazeby, & Williamson, 2014). However, it is unclear how many of the existing recruitment and retention strategies are developed in a way as to be both generalizable and effective at addressing these concerns (Brueton et al., 2013; Treweek et al., 2018). As in any other research problem, structuring investigation around a theoretical framework allows for a more discrete explanation of the causal mechanisms behind the observed phenomenon as well as a broader application of the learned relationships (French et al., 2012). The UK Medical Research Council (MRC) has provided a general guidance for developing interventions informed by theory in an effort to promote more systematic design (French et al., 2012). The design of interventions aimed at improving recruitment and/or retention should also follow such guidelines.

When designing such interventions, researchers need to think about what kind of theoretical framework they wish to employ. One approach to the issue of improving recruitment and retention is to think of them as behaviours that need to be modified (Gillies et al., 2018). For example, a recent publication sought to identify barriers to recruitment in cancer trials and described the development of an implementation intervention based on categorizing said barriers as having behavioural determinants (Ellis et al., 2019). Theories of behaviour have been utilized in health care settings to great effect, from promoting lifestyle changes to reduce risk of cardiovascular disease, smoking cessation, and to practices of safe sex (Fisher et al., 2011). Thus, employing a behavioural theoretical framework to identify issues within the behaviours of recruitment and retention to clinical trials, which happen in a healthcare setting (alongside other health behaviours that have been studied), is an approach that has been gaining attention in recent years (Gillies et al., 2018; Presseau et al., 2017).

Therefore, further investigation into approaches to recruitment and retention that employ behavioural theory to maximise utility is warranted. The research outlined in this protocol aims to address this issue by conducting a systematic mapping review of the available literature reporting behaviourally focussed approaches to recruitment and retention in trials and, where appropriate, how these approaches have been implemented in practice. To do so, we will search for studies, completed and ongoing, that apply a behavioural focus (from study inception or for interpretation of results) to recruitment and/or retention within the context of a clinical trial.

**Methods**

**2.1 Types of studies**

Studies that report the design, development or evaluation of recruitment and retention strategies, informed by behavioural approaches, for clinical trials will be included. Clinical trials are defined as “any type of research that studies new tests and treatments and evaluates their effects on human health outcomes… including medical interventions, drugs, cells and other biological products, surgical procedures, radiological procedures, devices, behavioural treatments and preventive care” (World Health Organization, 2019). The reported theories will be identified explicitly in the text by the authors and assessed by the review team as to whether they are a behavioural theory. This will be assessed through one of two mechanisms. The first is by comparing the theory name, and references for said theory, against a published list that has been developed through expert consensus and systematic search which sought to identify theories of behaviour and behaviour change of relevance to public health interventions across social and behavioural sciences (Davis, Campbell, Hildon, Hobbs, & Michie, 2015). Davis et al. identified such theories and also provided a list of excluded theories that appeared in their search but were agreed through consensus to not be behavioural (2015). For those approaches not explicitly referenced in this list, they will then be assessed through the second mechanism for eligibility. This second mechanism will evaluate whether an approach meets a definition of theory developed by Davis et al. (2015). This definition is:

“a set of concepts and/or statements with specification of how phenomena relate to each other. Theory provides an organising description of a system that accounts for what is known, and explains and predicts phenomena” (Davis et al., 2015).

The approach will also be evaluated as to whether it considers “individual behaviour as an outcome or part of the process leading to the outcome”, as this review is only concerned with the behaviours of individuals and theories that can explain those behaviours (Davis et al., 2015). This evaluation will be carried out by the lead author (TC), who will extract evidence regarding these criteria to bring to a meeting of the review team for consensus. This review will also include models/frameworks when we can establish that they have been developed from theoretical constructs from theories included within the published list or agreed to be behavioural by consensus of the review team (Davis et al., 2015). A model/framework will be defined as:

“organising structures of constructs that do not meet the definition of theory in that they do not offer predictions about how constructs relate to each other or allow prediction of outcomes” (Davis et al., 2015).

Types of included studies will contain:

* those that have developed a behaviourally focused understanding of recruitment or retention (e.g. use of semi-structured interviews or surveys developed using behavioural theory that identify key domains of importance to influence recruitment/retention);
* those that have developed a behaviourally focused recruitment or retention strategy/intervention to inform future studies (e.g. empirical studies that have developed interventions, such as using behavioural theory to develop training packages for health care professionals to improve recruitment, but have not been evaluated);
* those that have assessed effectiveness of a behaviourally focused intervention targeting recruitment and/or retention compared to a comparator.

**2.2 Exclusion criteria**

The following exclusion criteria will be applied:

* Studies evaluating a recruitment and/or retention strategy that do not have an explicitly defined behavioural theory;
* Studies exploring the challenges and solutions to poor recruitment and retention that do not use a behavioural framework to understand findings or develop strategy;
* Studies that aim to improve adherence to an intervention rather than completion of a trial.
* Hypothetical trials without empirical data will be excluded. Protocols describing future studies that will generate empirical data will be included.

**2.3 Search method for identifying studies**

A search strategy will be designed by the lead author (TC), refined through discussion with the Chief Investigator (KG) and Senior Information Scientist (PM), and informed by previous work conducted in this area, namely the Cochrane reviews available on both recruitment and retention (Brueton et al., 2013; Treweek et al., 2018). Searches will be applied to, MEDLINE, Embase, CINAHL, ERIC, PsycInfo, Web of Science, and ASSIA from their respective inception. A search for additional studies will be undertaken by checking the references of the included studies, along with relevant reviews and conference abstracts identified in the search. Conference abstracts will also be assessed to identify if a full, peer-reviewed study has been published.

**2.4 Eligibility of studies**

Citations identified through the search will be independently assessed via abstract by one reviewer with a second reviewer screening a select sample. Abstracts will be reviewed for explicit mentions of a potential behavioural theory or model/framework as well as assessing initial eligibility based on the inclusion/exclusion criteria. Any disagreements regarding eligibility will be discussed between reviewers to establish consensus. Full-text papers will be obtained for those studies that are considered potentially relevant on abstract screening and will be further assessed against the inclusion/exclusion criteria. The eligibility of a potential theory, or model/framework, as behavioural will be determined at this full-text stage. The eligible full-text papers will be assessed independently by two reviewers with a third reviewer acting as an arbiter if there is any disagreement.

**2.5 Data extraction**

Information from primary studies will be extracted by one reviewer with a select sample assessed by a second reviewer. The following summary data will be extracted and summarised from each study: author details; year and journal of publication; country of origin; study type; study aim; sample size; theory reported; application of theory (i.e. to develop intervention, to understand problem, to develop future strategy); patient and public involvement (PPI) in the study and, where relevant, parent study context (e.g. condition, trial design, intervention(s)). Study authors will be contacted if published data is unavailable or unclear.

**2.6 Data analysis**

This mapping review aims to synthesise summary findings across a range of different study designs and intervention types within similar study designs to describe current research in the area. Results of the studies will be presented in a narrative format, separated into sections by their intended target behaviour (i.e. recruitment, retention, or both). Further subdivision based on the study’s target population, clinical trial staff versus participants, may be warranted. Any other discrete sections will be based on themes evident after full-text review and summation.

**Outputs**

This review will provide a narrative summary of the evidence on behaviourally focused strategies to improve recruitment and retention in clinical trials. It will include both completed research and research underway. Taken together, this information will inform our future research agenda looking to develop behaviourally focused interventions designed to improve clinical trial recruitment and/or retention.

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