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The Use of Theory in Research

Abstract

All researchers should consider the theoretical basis for their studies very early on in the planning stage. The aim of this paper is to describe and discuss how theory (a 'comprehensive explanation of some aspect of nature that is supported by a body of evidence') can inform and improve the quality and relevance of pharmacy-based research. Theories can be applied at many stages of quantitative and qualitative (and mixed) research processes, including: providing rationale for the study; defining the aim and research questions; considering the methodological stance; developing data collection and generation tools; providing a framework for data analysis, and interpretation. The focus of the paper is on the use of theoretical lenses, their selection and application. Two key theoretical lenses and their potential applications are described: the Theoretical Domains Framework in studies of behavioural change, and Normalization Process Theory in implementing, embedding and integrating interventions.

The Use of Theory in Research

Researchers should consider the theoretical basis at the outset of planning a study. However, the application of theory in research can be confusing, with a multitude of terms and definitions, and many approaches described. This paper discusses how theory can inform and improve the quality and relevance of quantitative and qualitative pharmacy-based research.

Defining 'theory'

'Theory' is derived from ancient Greek 'theoria', meaning 'looking at' or 'being aware of'. There are many modern definitions such as, '…an explanation of a phenomenon arrived at through examination and contemplation of the relevant facts; a statement of one or more laws or principles which are generally held as describing an essential property of something' [1]. Theories of most relevance to pharmacy are drawn from disciplines including: sociology; psychology; anthropology; and biomedical sciences [2].

Use of theory in research

Considering theory in research enhances robustness and rigour, and the relevance and impact of the findings. Theories can connect pieces of research data to generate findings which fit into a larger framework of other studies. Theories can be applied at many stages of quantitative and qualitative (and mixed) research processes and in many different ways, as outlined below. Several methodologists have stressed the need to describe clearly how theory has been applied [3].

1. Justifying the rationale for the research

The background section to any research proposal or paper should describe those theories which are applied widely within the field. This will enable authors to develop arguments, justify their research and ascertain how findings could impact practice. For example, in order to enhance the subsequent development of an effective intervention an

understanding and application of theories of behavioural change is essential when researching medication adherence and how to potentially alter behaviour.

2. Constructing the research aim

Theories can be used to construct and explain the research aim and questions which, for example, could include aspects of behaviour change theories.

3. Considering the methodological or theoretical stance

Once the research aim and questions have been constructed, it is important to consider the most appropriate methodological or theoretical stance. This requires an understanding of the methodological theories which underpin quantitative and qualitative approaches. Those most common methodologies are:

i) quantitative – RCTs , cohort studies, case control studies, cross-sectional surveys, and
ii) qualitative – narrative, phenomenology, ethnography, grounded theory, case studies.

Grounded theory is particularly relevant to a discussion on the use of theory in research. Essentially, grounded theory generates new knowledge which is then used to develop new theories [4].

4. Developing data collection and generation tools

A theoretical perspective, often termed a 'theoretical lens', can be used in designing the study and developing data collection tools in quantitative research (e.g. questionnaires) and data generation instruments in qualitative research (e.g. interview schedules and focus group topic guides). Such an approach has the potential to enhance the robustness and rigour by ensuring that the research findings are theory driven [3,5,6].

5. Data analysis and interpretation

Adopting a theoretical lens can aid data analysis and interpretation. For example, in qualitative analysis, it can form coding frameworks for thematic analysis [3,5,6].

In qualitative and quantitative research, findings can be considered in light of the theories outlined in the background section, thereby facilitating their interpretation.

Theoretical lens

The use of a theoretical lens within pharmacy-based research has traditionally been lacking and, hence, is the focus for the remainder of this article. The United Kingdom Medical Research Council guidance on 'Developing and implementing complex interventions' highlights the role of cognitive, behavioural and organisational theoretical lenses [7]. This guidance describes four elements of: development; feasibility/piloting; evaluation; and implementation. Theory is a key aspect of development, '…you also need to be aware of the relevant theory, as this is more likely to result in an effective intervention, than is a purely empirical or pragmatic approach'. For example, it is often important to study changes in behaviour around interventions to provide information on how an intervention has been successful (or not). Embedding behaviour change theories will generate findings which can be related to how and why a change has occurred (or not). However, a recent systematic review highlights the poor use of theory in implementation research [8].

Theories can be categorised in many ways. Common clusters are: interpersonal communication (e.g. network theory); mass media (e.g. agenda setting theory); organisational communication (e.g. communities of practice); information technology (e.g. computer mediated communication); and health communication (e.g. social cognitive theory).

Given the vast number of theories, selecting an appropriate theoretical lens requires expertise and consideration of factors including: the field of research; the research

problem and its nature; available theories and their nature; and how others have used the theories.

Wacker outlined the criteria of a 'good theory', as:

1. explanatory - providing explanations around variables and effects; being testable, predictable and verifiable
2. plausible - providing meaningful explanations which are consistent with existing facts
3. explicit - summarising, explaining and organising facts
4. parsimonious - using a few variables which are arranged simply to explain effects [9].

Examples of theoretical lenses

As described earlier, there are many different theories which could be used as a theoretical lens. In this section, two key theories are described in terms of their development and use; the Theoretical Domains Framework and Normalization Process Theory.

1. Theoretical Domains Framework (TDF)

TDF is not a theory but a framework of theories of behaviour change. To overcome the challenge of selecting the most appropriate theory from the vast number available, TDF was developed through expert panel consensus and validation by a group of psychological theorists, health service researchers and health psychologists [10]. TDF aims to '…simplify and integrate a plethora of behaviour change theories and make theory more accessible to, and usable by, other disciplines' [11]. TDF derived from 33 psychological theories and 128 theoretical constructs, which are organised into overarching domains (initially there were 12 and this has now been extended to 14) as described in Table 1.

Insert Table 1 here

These domains were validated further by a group of behavioural experts [11]. TDF can be used in quantitative and qualitative research to understand and characterise the domains of behaviour which need to be targeted in any intervention. These behaviours can apply at all levels, depending on the nature and aim of the study, from managers, leaders, policy makers, practitioners and patients. For example, if studying the behavioural domains around medication adherence, it may be that behaviour change intervention is required in practitioners and patients. TDF has been used extensively within healthcare-related research, embedded into research methodologies ranging from RCTs to phenomenology. Fields of study have included: smoking cessation; physical activity; hand hygiene; acute low back pain; and schizophrenia [12].

There are several ways in which TDF can be used as a theoretical lens. In quantitative research, it can aid the construction of data collection tools such as questionnaires, with items mapped to TDF domains [13]. Examples are:

Domain – knowledge

'I am aware of guidelines relating to……..'

'I know how to deliver…… according to guidelines……'

'With regard to ……I know what my responsibilities are'

Domain – social/ professional role and identity

'Delivering…….. following guidelines is part of my work as …..'

'It is my responsibility as …… to deliver…… following guidelines'

Domain – beliefs of consequences

'For me, delivering….. following guidelines is [not at all useful – very useful]'

'For me, delivering….. following guidelines is [not at all pleasurable – very pleasurable]'

'If I deliver…..following guidelines…… will be most effective'

'If I deliver…..following guidelines this will strengthen professional collaboration…..'

Similarly, in qualitative research TDF can be used to develop semi-structured interview schedules and focus group topic guides, and as a coding framework for thematic analysis. One of the many benefits of using TDF to identify key behavioural domains is that these can then be used as intervention targets. For example, if family members are impacting medication adherence (TDF domain of social influences) then educating the patient alone is less likely to alter adherence than an intervention focusing on the family.

At Robert Gordon University (RGU) we are using TDF as a theoretical lens in several studies of behaviour. The global under-reporting of medication errors by health professionals is widely acknowledged. In a sequential mixed methods study of behavioural determinants of under-reporting, we have used TDF in the development of a questionnaire to elicit the key determinants (e.g. beliefs of consequences, emotions, etc.). TDF has also been used in the development of a semi-structured interview schedule to explore further these determinants. The findings will then be used in the development of an intervention to optimise reporting thus enhancing the effectiveness and efficiency of reporting, potentially impacting patient safety. Similar approaches are being used in studies of: oil installation workers and self care behaviours; non-medical prescribers and decision making; and use of multi-compartment compliance aids.

2. Normalization Process Theory (NPT)

Another theory being used increasingly as part of implementation research is NPT, which is a set of sociological tools. NPT explains '…the social processes through which new or modified practices of thinking, enacting and organising work are operationalised in healthcare and other institutionalised settings' [14]. NPT is concerned with three core problems: implementation - the social organisation of bringing practices into action; embedding - the process through which practices become incorporated routinely into everyday work; and integration - the process by which practices are reproduced and sustained [14,15]. The theory proposes that:

1. practices become embedded routinely in social contexts as the result of people working, individually and collectively, to implement them;
2. the work of implementation is operationalised through four generative constructs of: i) coherence, ii) cognitive participation, iii) collective action, and iv)reflexive monitoring, and
3. the production and reproduction of a practice requires continuous investment.

The NPT constructs are described further in Table 2.

Insert Table 2 here

There is an excellent NPT website offering 'a set of conceptual tools and explanatory models' to enable researchers to 'think through the processes involved' [16]. NPT can be used in different study designs and in similar ways as described for TDF, by paying attention to the four constructs. It can be used to: develop tools for surveys by mapping questionnaire items to each construct; develop interview schedules and topic guides, and coding frameworks for qualitative research; and consider the interpretation and impact of findings.

NPT can also be used to develop interventions which can then be the subject of evaluation research. By considering coherence (sense making, shared beliefs), cognitive participation (relational work), collective action (operational work) and reflexive monitoring (appraisal work), the intervention is more likely to be sustained. In evaluation studies, NPT can be applied at all levels to guide: the design; setting; who to research; what to research; analysis; and interpretation. It may also be important to embed (or nest) some qualitative work within the RCT to get richer data around the intervention implementation, operation and sustainability [17,18].

At RGU we are also using NPT, for example, in studying the processes of medicines management in secondary care (e.g. medicines reconciliation) from health professionals' perspectives. In a qualitative study, NPT has been used in the development of the interview schedule and analytical framework. We are interested in how processes operate at different levels of seniority and between different professions. We are focusing on: coherence (e.g. shared beliefs of process aims); cognitive participation (who does what); collective action (what they do); and reflexive monitoring (how outcomes are assessed). By using this theory, we can research how the processes operate across the organisation, with implications for efficiency and effectiveness, potentially impacting patient care. NPT is also being used in organisational studies of the implementation of electronic prescribing in secondary care.

In summary, it is becoming increasingly important to consider the application of theory at the outset of research and to avoid the situation of finding a theory to fit at the point of data analysis. Use of a more theoretical approach will enhance the robustness, rigour and relevance and, most importantly, increases the likelihood of research impacting practice.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Table 1: Description of TDF domains (adapted from [11])

TDF Domains	**Description**
Knowledge	An awareness of the existence of something
Skills	An ability or proficiency acquired through practice
Social/Professional Role and Identity	A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting
Beliefs about Capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use
Optimism	The confidence that things will happen for the best or that desired goals will be attained

Beliefs about Consequences	Acceptance of the truth, reality, or validity about outcomes of a behaviour in a given situation
Reinforcement	Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus
Intentions	A conscious decision to perform a behaviour or a resolve to act in a certain way
Goals	Mental representations of outcomes or end states that an individual wants to achieve
Memory, Attention and Decision Processes	The ability to retain information, focus selectively on aspects of the environment and choose between two or more alternatives
Environmental Context and Resources	Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behaviour
Social Influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviours
Emotion	A complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event

Behavioural Regulation	Anything aimed at managing or changing objectively observed or measured actions

Table 2: Description of NPT constructs (adapted from [16])

NPT constructs	Description
Coherence	- relates to the sense-making work that people do individually and collectively - has four components of: differentiation (how a set of practices and their objects are different from each other); communal specification (people working together to build a shared understanding of the aims, objectives, and expected benefits); individual specification (people need to do things that will help them understand their specific tasks and responsibilities around a set of practices), and internalization (involves people in work that is about understanding the value, benefits and importance of a set of practices)
Cognitive participation	- relational work that people do to build and sustain a community of practice - has four components of: initiation (when a set of practices is new or modified, a core problem is whether or not key people are working to drive them forward); enrolment (people may need to organize themselves and others in order to collectively contribute to the work involved); legitimation (work of ensuring that other people believe it is right for them to be involved, and that they can make a valid contribution), and activation (people need to collectively define the actions and procedures needed to sustain a practice)
Collective action	- operational work that people do to enact a set of practices. - has four components of: interactional workability (interactional work that people do with each other and with other aspects of a set of practices); relational integration (work that people do to build

	accountability and maintain confidence in a set of practices and in each other); skill set workability (allocation work that underpins the division of labour that is built up around a set of practices), and contextual integration (resource work in managing a set of practices through the allocation of different kinds of resources and the execution of protocols, policies and procedures)
Reflexive monitoring	- appraisal work that people do to assess and understand the ways that a new set of practices affect them and others around them - has four components of: systematization (people in any practice may seek to determine how effective and useful it is for them and for others); communal appraisal (people work together evaluate the worth of practice); individual appraisal (people also work experientially as individuals to appraise effects on them and their contexts), and reconfiguration (appraisal work by individuals or groups may lead to attempts to redefine procedures or modify practices)