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**Mobilising Physiotherapy knowledge: understanding the best evidence and barriers to implementation of hydrotherapy for musculoskeletal disease**

Objectives:

To explore two linked strategies to highlight the best current available evidence for hydrotherapy and to explore the barriers and enablers to mobilising this evidence into practice.

Method:

Phase 1: The best published evidence for hydrotherapy was collated using a Critically Appraised Topic (CAT) methodology. The focus was the best available research evidence for hydrotherapy in musculoskeletal conditions (osteoarthritis (OA), juvenile idiopathic arthritis (JIA), rheumatoid arthritis (RA), ankylosing spondylitis (AS) and low back pain (LBP)). Once evaluated for quality, a summary of the evidence was produced in a Clinical Bottom Line (CBL).

Phase 2: A Focus Group explored the: CBL, the barriers and facilitators of

embedding the best evidence for hydrotherapy into practice.

Results:

Phase 1: The CAT identified seven studies which indicated hydrotherapy had beneficial, although short term, effects for common musculoskeletal conditions.

Phase 2: Six participants from primary, secondary care, private practice and education discussed the evidence identified. They highlighted issues such as: understanding the value of hydrotherapy, an overuse of quantitative methodologies and the quality of existing research as being barriers to this knowledge being actively mobilised into clinical care.

Conclusions:

These two linked enquiries (CAT and Focus Group) identified the best evidence and the basis for discussion to explore barriers and facilitators of evidence use in practice. This gave an understanding of the reasons for the research to practice gap and thereby allows planning of knowledge mobilisation strategies to reduce this.

**Mobilising Physiotherapy knowledge: understanding the best evidence and barriers to implementation of hydrotherapy for musculoskeletal disease**

**Contribution of the paper**

This paper adds an understanding of two stepped approach to mobilising knowledge into practice, using hydrotherapy an example.

This paper:

Combines two knowledge mobilisation strategies together to:

* identify and appraise the best existing literature and create a clinical bottom line
* explore the barriers and solutions to implementation

Whilst the focus is hydrotherapy it is concluded that combining these two methods

may be successful for other areas of practice

**Key words** Knowledge Mobilisation, Hydrotherapy, Critically Appraised Topic,

Musculoskeletal, Focus Group

I**ntroduction**

The delay in translating evidence based treatment into clinical care is well recognised and is

defined as the ‘evidence to practice gap’ (Lau, Stevenson and Ong, 2014). It is suggested that it takes approximately 17 years for good quality evidence to be translated into clinical practice (Green, Ottoson, Garcia and Hiatt, 2009). Attempts have been made to minimise the gap or time delay using knowledge mobilisation strategies. Knowledge mobilisation refers to any activities aimed at creating and communicating research based knowledge within a healthcare system (Ferlie, Montgommery, Reff-Pederson, 2016).

It is imperative that those with musculoskeletal (MSK) conditions receive timely evidence based care, for health and economic reasons. The extent and burden of MSK disease is well recognised, causing 21.3% of the total years lived with disability, being the fourth global burden on health (Woolfe, 2015). Evidence suggests, that for most musculoskeletal conditions, remaining active and undertaking exercise has a positive clinical and financial impact (Public Health England, 2017;NIHR themed Review 2018 and Versus Arthritis, 2019).

Hydrotherapy is one such form of therapeutic exercise that can be used to support the management of a range of MSK conditions and has been found to be beneficial for those with lower limb osteoarthritis (OA) (McAlindon et al 2014, Bartels et al 2016; Cochrane, Davey and Edwards), Rheumatoid Arthritis (RA) (Batterham, Heywood and Keating; Al-,Qubaeissy, Fatoye,Goodwin and Yohannes, 2013), Juvenile Idiopathic Arthritis (JIA) (Elnaggar and Elshafet, 2016), Low Back Pain (LBP) (Shi et al 2018) and Ankylosing Spondylitis (AS) (Dundar et al, 2014). It has the unique ability to assist and enable movement and activity, which may prove difficult on dry land (Cole and Becker 2004).

Whilst empirical evidence, national (Aquatic Therapy Association of Physiotherapists, 2015; Chartered Society of Physiotherapy, 2015; ATACP, 2015) and international guidelines (WCPT, 2015: Macfarlane, 2017;) recommend its use, hydrotherapy services are often under additional pressure and scrutiny due to questions over its cost effectiveness. The knowledge to assist clinicians, managers and healthcare purchasers needs to be available and understandable so those delivering and commissioning services can utilise the evidence to best effect. For the purpose of this study the term ‘hydrotherapy’ was given to mean an exercise modality that can be undertaken in warm water to aid patient rehabilitation (Reid-Campion 2000). In this context, knowledge mobilisation can be as defined getting knowledge to where it will be used, making the evidence accessible, understandable and useful for those using the knowledge (http://www.kmbtoolkit.ca/what-is-kmb,2020).

Previously we have described how a well established Community of Practice (CoP) model (Stevenson et al, 2021) has utilised the ‘Critically Apprised Topic process’ as the basis for improving clinical care based on the best quality published evidence. A CoP utilises a group of individuals who convene to discuss concerns around a particular topic (Wenger, McDermott and Snyder,2002) and they assist in the process of learning among groups within a workplace (Terry et al, 2020). The participants involved share their experience and expertise and have the opportunity to drive strategy, solve problems, transfer best practice and develop skills (Lesser and Storck, 2001 and Wenger, McDermott and Snyder,2002). Its emphasis should be on solving problems through learning and enquiry.

All use a Critically Appraised Topic process (Foster, Barlas, Chesterton and Wong, 2001 and Stevenson et al, 2007) to search for, critically appraise and summarise the best available evidence to answer a specific clinical question. Those who participate have the ability to review the quality of available evidence as well as translate its meaning for the clinical audience. This method has been suggested for its suitability for use in clinical practice for those who have limited research experience (Akbeng, 2005). It has been utilised to: successfully change clinical care, identify areas for further research, support ongoing research and contribute to staff training and development (Stevenson et al, 2007 https://www.keele.ac.uk/pcsc/research/impactacceleratorunit/evidenceintopracticegroups/ accessed 2020). This method is not a systematic review, as it does not seek all the published and unpublished literature in the areas of interest. The process aims to find the best available published evidence that answers a specific clinical question that is constructed using the PICO framework (Population, Intervention, Comparison and Outcome).

The aim of this study was to link two methods of enquiry (CAT and Focus Group) to identify the best available research on a given topic, but then to explore in greater detail the barriers and facilitators for it implementation. By giving us a greater understanding of the reasons for the research to practice gap Knowledge Mobilisation strategies could be planed to reduce this.

Ethical approval was given by Keele University Ethics Committee (July 2016).

**Methodology**

**Phase 1- Critically Appraised Topic (CAT)**

Phase 1 focused on summarising the best available published evidence around a specific answerable clinical question. Firstly, a clinical question around hydrotherapy for musculoskeletal disease was developed using the PICO framework (Schardt et al, 2007).

This process identified and refined the population of interest, the comparison and outcomes of interest. Search terms used for the ‘Intervention’ included hydrotherapy, aquatic therapy, balneotherapy, water therapy, spa treatment, Halliwick, therapeutic aquatic exercise and surprised hydrotherapy. The resulting clinical question was:

*In adults and children with AS, RA, OA, LBP and JIA does hydrotherapy compared with usual care or dryland physiotherapy reduce pain, improve function, well-being, return to work or school or is it cost effective?*

As per the CAT process, appropriate databases were searched by an independent librarian between the timeframe 2005-2015, using search terms generated in the PICO process.

Abstracts that were identified by the search were checked for their appropriateness to answer the clinical question by a clinician and a researcher. Abstracts were removed if they did not answer the specific clinical question. From those abstracts that remained, the full text articles were appraised using the CASP tool by two reviewers.

The CASP tool requires a ‘yes’, ‘no’ or ’can’t tell’ response to 11 specific questions concerned with quality and rigor of the research being reviewed. There is no numerical scoring system used, but an opportunity for a narrative comment under each question. In conclusion, the tool encourages a conclusion to be drawn about the evidence based on the 11 questions and would practice change in light of it. The result of this is to produce a ‘Clinical Bottom Line’ (CBL), an answer to the specific clinical question based on the best research available.

The CASP tool was used to apprise each individual piece of research evidence identified in the search and clinical bottom lines were generated according to its quality. Agreement was reached between two independent reviewers. The evidence generated from this process was taken into Phase 2 for discussion within a Focus Group.

**Phase 2- Focus Group**

Phase 2 focused on sharing the CBL from Phase 1 with the members of the Focus Group (FG) to discuss the barriers and solution to implementing the hydrotherapy evidence into practice.

Purposive sampling (Bowling, 2014) was used to gain representation from experts in the NHS, private sector and education to ensure those professionals had expertise and insight into hydrotherapy (Bourgeault, Dingwall and DeVries, 2010). A sample of 6 healthcare professionals participated, all specialised in musculoskeletal diseases. They included a private physiotherapist, a rheumatology nurse specialist, an NHS manager, a physiotherapist working in an NHS setting, a consultant rheumatologist and lecturer in physiotherapy. The FG was audio tape recorded and had three distinct phases:

1.The participants were consented and the overall aim and purpose of the study was reiterated.

2. Presentation of the evidence and CBL generated in Phase 1

3. Discussion of the barriers and solutions to implementation.

A topic guide was developed and used to ensure facilitated discussion. The FG was concluded after three hours, as no new data was being revealed (data saturation). Audio tape recordings were transcribed and analysed using thematic analysis (Kisely and Kendall, 2011). The aim was to identify, analyse and report patterns or themes within data (Crab and Chur-Hansen,2009). Colaizzis’s descriptive phenomenological method (Colaizzi,1978) was used to organise the themes into categories and to provide an overall structure and a clear audit trail. To reduce personal bias (Streubert and Carpenter, 2011) the data transcripts and themes were verified to enhance trustworthiness by an external expert.

**Results**

**Phase 1- Critically Appraised Topic (CAT)**

The search revealed a 252 possible research records. After reading the research abstracts this was reduced to 32 records, those deleted didn’t answer the specific clinical question. The 32 articles were then reviewed in full and further reduced to seven articles, which specifically answered the clinical question. The seven articles were:

Epps et al 2005, Dundar et al 2009, Batterham et al 2011, Al--Qubaeissy et al 2013, Baker et al 2014, Dundar et al 2014 and Bartels et al 2016. From the seven articles the Clinical Bottom Line was produced:

*There was good quality evidence to suggest that hydrotherapy may have small, beneficial, short-term effects on pain, disability, physical function, mobility and quality of life in adults with AS, RA,LBP and OA of the hip and knee. These effects are comparable with land-based exercises. However long-term evidence is unclear. No research included cost effectiveness, return to work or patient preference data.*

*Additionally there was no statistically significant evidence that land-based exercise alone can improve functional ability, quality of life, or pain for children with JIA. Some evidence supports short term beneficial effects on quality of life & disease outcome for patients with JIA from both hydrotherapy & land-based physiotherapy. The long-term effects of hydrotherapy are unclear.*

**Phase 2- Focus Group**

The demographic characteristics of the participants are included in Table 1. Eight key themes emerged from the analysis of the data. These were:

* A current reliance on quantitative research
* Hydrotherapy in clinical practice and the current clinical research findings are not aligned
* The amount and quality of evidence
* Health professionals understanding of the value of hydrotherapy
* Availability of hydrotherapy services
* Role of voluntary organisations and the service users voice
* Professional responsibility and advocating hydrotherapy
* Funding opportunities

**Theme 1: A current reliance on quantitative research**

Participants questioned whether the current reliance on quantitative research methodology

was appropriate.

*‘Are RCT’s the best way to answer this question or is it actually better through case studies?*

*Because in those sort of complex patients, like you were talking, about with spinal problems,*  *knee problems and everything, they are never going to be represented in an RCT because*

*they are too complicated (P5)*

*‘I think perhaps researchers are focussing on the wrong types of studies’ (P1)*

Participants identified that the outcomes being measured focussed on physical improvements and excluded the impact on psychological wellbeing and quality of life.

*‘I’m not convinced that any of those (outcome measures) pick up quality of life or a*

*confidence change in children’ (P6)*

*‘So not thinking about the physical improvement, the measurement of physical improvement, but thinking about the psychological impact’ (P2)*

**Theme 2: Hydrotherapy in clinical practice and the current clinical research findings**

**are not aligned**

Differences were identified by participants between the use of hydrotherapy in clinical

practice and the research investigating the effectiveness of hydrotherapy. In clinical practice

hydrotherapy is used to develop confidence to exercise, both independently and as part of a

social group; as well as an introduction to engaging in other types of exercise.

*‘If they see another child with a similar condition, who they are playing with (in the*

*hydrotherapy pool), if you like, it can break down a lot of barriers and build their confidence*

*as well’ (P2)*

*“It is an introduction to a way of an individual being able to exercise permanently” (P3)*

*‘“Getting them into the pool, playing games of volley ball, they don’t realise they were*

*exercising (p6)*

Participants felt that research comparing hydrotherapy with land based exercises was

artificial as in clinical practice, hydrotherapy and land based exercises are used for different

purposes:-

*‘The way we use hydro is almost like a precursor type of thing so that they will be able to do*

*land based (exercises) better. From a research point of view I don’t know how they*

*compared it’ (P4)*

*‘We use it as an opportunity to be able to get some of those patients that we can’t actually*

*get into a gym straight off, to get them going and then move them onto the land based. So I*

*think a direct comparison isn’t actually a true clinical representation’ (P1)*

*‘ Hydro has been used as a comparator to land exercise to promote land based exercise*

*rather than to look at hydro” (p6)*

**Theme 3: The amount and quality of evidence**

Some of the participants expressed concerns regarding the quality of the available

evidence.

‘There isn’t the research out there that’s of sufficient quality that you can give to people,

and say, this is what happens (P4)

**Theme 4: Health Professionals’ understanding of the value of hydrotherapy**

All participants expressed concern that a lack of knowledge on the purpose of hydrotherapy

might influence which patients that are referred to this service:-

*‘There are barriers to, not the evidence, but to understanding its role. That you can use it*

*(hydro) with someone that you wouldn’t think you could do anything with, in order to get*

*them to a level where they could do land exercise. I’m not sure that a lot of rheumatologists*

*would know that’ (P5)*

*‘It’s not just rheumatologists (that don’t understand hydro) I would extend that to orthopods*

*As well and lots of medics’ (P3)*

*‘Our undergrads (physiotherapy students), if they are lucky, they might get a placement*

*(hydrotherapy). But equally, if they don’t, they might only get 1 hour in the pool in the whole of their 3 year training’ (P6)*

**Theme 5: Availability of hydrotherapy services**

Participants raised the possibility of developing relationships with community providers and

school swimming pools, that have warmer pool temperatures, and commissioning

hydrotherapy services external to NHS pools. This would enable patients to self- manage

Their conditions and increase access to hydrotherapy.

*‘Looking at going out into the community and building relationships with education and*

*Looking*  *in the special schools. Utilising what is out there as much as possible’ (P3)*

*“Perhaps we need to look at services going out into the public sector, with an expectation*1 *that*  *patients do their maintenance themselves-a bit like dentistry (P1)*

*“Give patients a list of pools where they can go” (P4)*

**Theme 6: Role of voluntary organisations and the service users’ voice**

Participants proposed that service users and patient support organisations including the

National Ankylosing Spondylitis Society (NASS) may be able to help subsidise hydrotherapy

treatment sessions and play an active role in commissioning services

‘*There is a role maybe… with those third sector organisations who actually subsidise hydro*

*on the QT really’. ‘The NASS group and Arthritis Care, say “we can’t give you anymore on*

*the NHS, but this is your way of continuing on in the same pool, in the same environment’ (P6)*

*‘ “There is a very powerful expert and patient opinion that we are hearing, that hydro is*

*effective (P5)*

*‘Patient testimonials are what brings people into our business (private physio), its word of*

*mouth and that is completely overlooked in commissioning, until there is an outcry by service*  *users when a service is taken off’ (P1)*

**Theme 7: Professional responsibility in promoting hydrotherapy**

Participants advocated that Professional Bodies and qualified Physiotherapists, as

autonomous practitioners, should determine patient’s suitability for hydrotherapy; promote it

as a specialist service; recommend treatment guidelines and support appropriate research to

justify its use nationally.

‘*Maybe we need to be in charge of who we choose to access that service (hydrotherapy)’*

*(P1)*

*‘The idea of a block of 6 (sessions of hydrotherapy) for everybody horrifies me, I just think everybody’s different, somebody may need 2, somebody might want more. We are*

*autonomous practitioners, and we should be saying, ‘actually I’m not doing that, that’s not acceptable’*

*(P6)*

*‘The only thing we have at the moment is ….. all of the contra-indications, that’s the*

0*nly*  *thing that stops people getting into the pool. Being just physically not able to, for medical*  *reasons’ (P4)*

**Theme 8: Funding opportunities**

Participants identified a need to source more imaginative methods of income generation to

support completion of appropriate research which could be used to promote commissioning

of hydrotherapy services.

*‘Commissioners actually can sometimes place more value on patient stories and case*

*narratives, rather than the evidence’…. ‘get some case studies locally to try and push the argument (with commissioners) in terms of getting funding for pool maintenance and that*

*sort* 283 *of thing’ (P5)*

*‘Need to link in more with our clinical colleagues and almost commission some case studies*

*that can be MSc projects’….‘proper case histories that you write up in a rigorous way and*

*get published’….‘some devoted funding to actually support this’ (P6)*

In summary good quality evidence was identified through the CAT process in Phase 1. The focus Group in Phase 2 allowed a more in depth exploration of the barriers and facilitators to evidence being utilised in practice.

**Discussion**

The aim of this study was to link two methods of enquiry (CAT and Focus Group) to identify the best available research on hydrotherapy, and then to explore in greater detail the barriers and facilitators for its implementation. These linked strategies give us greater understanding of the reasons for the research to practice gap and allow us to plan knowledge mobilisation strategies to reduce this.

This study highlights that the linked methods of enquiry gave a greater understanding of the quality of the available evidence and also the contextual factors that influence the ability to embed this into practice. This may help in planning knowledge mobilisation strategies to help in reducing the gap or time delay of 17 years between research being undertaken and results filtering into practice (Blair, 2014). In our example of hydrotherapy, its use is recommend by The National Institute for Clinical Excellence (NICE) as an adjunctive therapy for patients with Spondyloarthropathy (NICE, 2018), however from our Focus Group we know that this evidence does not filter down to commissioning or delivery of this intervention. Lack of resources, lack of awareness and understanding of the evidence may also contribute to this delay (Shifaza, Evans and Bradley, 2014). The Focus Group highlighted the lack of availability of hydrotherapy services was also a key factor.

In this study, we recognised the importance of including opinion leaders and change agents, especially in the FG. The use of such leaders draws on psychological and sociological theory (Nilsen, 2015), which acknowledges the importance of mutual knowledge exchange. The FG allowed contextual, cultural and organisation factors to be discussed. It is suggested, complex organisational, professional or social factors can cause knowledge to become stuck (Ferlie, Montgommery and Reff-Pedersen, 2016), the FG methodology was used to gain a greater understanding of these issues and provided an opportunity to explore meaningful and context specific solutions.

The strength of the CAT methodology, used in Phase 1, lies in its structured process, giving clear guidance for each step to assist busy clinicians. It could be viewed as step 1 in a knowledge mobilisation process. The clinicians generating the PICO have a clear understanding of their own context, their clinical dilemmas and understand how to influence change within their own organisational setting. The resultant PICO is a specific, structured and answerable question, that allows the searching criteria to be refined, resulting in a collection of evidence that is relevant to both practice and organisational context. Through this process it is also possible to gain a clear understanding of the gaps in the available literature, a clear benefit for researchers. Another strength of this process, include bringing together like-minded people who want to drive improvement in patient care. With expert facilitation, all opinions are valued and heard, thereby creating an understanding of the new knowledge but also an opportunity to highlight barriers and enablers to knowledge translation.

The limitation of this study was that it was small, local and predominantly clinically focused. This could have been strengthened by including patient representatives and commissioners of healthcare. It is also important to recognise that the CAT methodology is not a systematic review and does not aim to find all available evidence but seeks the best available research around a specific and refined and answerable clinical question.

This study drew together the best evidence around hydrotherapy to answer a specific clinical question. The CBL gave a summary of the best evidence in an understandable and usable format. The Focus Group allowed deeper exploration of the factors affecting implementation of this knowledge and of hydrotherapy. The FG identified the concerns health professionals involved in the delivery of hydrotherapy have with the limitations of current research, which focuses primarily on the use of RCTs. It was suggested that future research methodologies needs to reflect the potential impact on a range of health outcomes, patient preferences and its cost effectiveness to ensure its future. This may help in capturing a broader range of outcomes for more complex patient presentations. In the FG, healthcare professionals, shared their clinical observations that patients receiving hydrotherapy experienced additional benefits to improvements in physical health. These included developing confidence in exercising, increased social interaction and an improvement in psychological wellbeing and it was important to capture these outcomes. The study did not specifically explore patient complexity but the FG recognised the importance of collecting outcomes that captured more than physical improvement.

The FG highlighted the lack of qualitative studies exploring the wider impact of hydrotherapy on quality of life and this has been acknowledged by other researchers (Lau, Stevenson and Ong, 2014). The use of qualitative research could complement the existing evidence and increase our understanding about the role of hydrotherapy on an individual level and the potential benefits of hydrotherapy on psychological and social function in those with MSK pain. Qualitative interviews have been used with patients with Psoriatic Arthritis having hydrotherapy (Lindqvist and Gard,2013) and revealed improvements in self efficacy and mood.

In Phase 1, the CAT process, identified a lack of research that explored the cost effectiveness of hydrotherapy and the FG identified this would be useful for those commissioning care. A subsequent study (Teng, et al 2019) has established the cost effectiveness of hydrotherapy when compared to land-based treatment for patients with Low Back Pain, Rheumatoid arthritis and those undergoing Total Hip and Knee Replacement, but not for those with Osteoarthritis.

In conclusion, combining two methods of enquire (CAT and Focus Group) is an

effective method of identifying relevant evidence and the barriers and solutions to its

implementation. In our example, the CAT process identified the short-term physical benefits of hydrotherapy for people with a MSK conditions. The FG then gave a greater understanding of the limitations of the available research and the lack of understanding and availability of hydrotherapy. Whilst hydrotherapy was the specific clinical focus used for this study any clinical dilemma could be explored using this methodology. Strategies to mobilise this, or other types of knowledge, can take into account the evidence and the specific context into which it will be mobilised. Future research is required to test this method with other clinical dilemmas.

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