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Masterprogrammet i klinisk medicinsk vetenskap

Huvudämnet klinisk medicinsk vetenskap

Examensarbete, 15 högskolepoäng

Vårterminen 2013

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## Effects of Motivational Interviewing on Outcome in Physiotherapy Interventions - A Systematic Review

Effekter av motiverande samtal på sjukgymnastiska interventioner.  
– En systematisk litteraturstudie.

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## **Effects of Motivational Interviewing on Outcome in Physiotherapy Interventions - A Systematic Review**

### **ABSTRACT**

Motivational Interviewing (MI) is a client-centered style of counseling to elicit behavior change developed by Miller and Rollnick in the 1980's. Initially aimed at treating substance abuse, where it has strong evidence, it is moreover implemented with emerging evidence in other areas such as compulsive gambling, correctional treatment, medicine adherence and health-promoting. In Sweden for some years and particularly after its political endorsement and inclusion in the national guidelines for preventing disease in 2011, MI has been increasingly used within Physiotherapy care. In a search 2013-03-01 no review was found exploring the effects of MI on outcomes in physiotherapy. A systematic review following the PRISMA and CONSORT statements was carried out between 2013-03-15 to 2013-05-01 searching databases Pubmed, Cinahl, PsychInfo and PEDro. One randomized controlled study, one pilot study and one ongoing study were found eligible. A meta-analysis was not applicable due to sparse results. The studies found suggested significant positive results in some outcomes for the MI interventions but lacked power in others and had methodological shortcomings. Future well-designed controlled trials are warranted with emphasis on evaluation of MI fidelity and Minimal Clinical Important Change in addition to significance values.

Systematic review registration number: CRD 420130004341, PROSPERO register

Keywords: Motivational Interviewing, Physical Therapy, Physiotherapy, Systematic Review, Effect Study



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## **Effekter av motiverande samtal på sjukgymnastiska interventioner. – En systematisk litteraturstudie.**

### **SAMMANFATTNING**

Motiverande samtal (MI) är en klientcentrerad form av rådgivning för att locka fram beteendeförändring vilken har utvecklats av Miller och Rollnick på 80-talet. Ursprungligen användes den inom missbrukarvården där den har god evidens men har sedermera använts inom andra områden som spelmissbruk, inom kriminalvården, efterföljsamhet av medicinering och hälsofrämjande. Intresset för MI i form av utbildning och implementering inom sjukgymnastiken har ökat de senaste åren i synnerhet efter införandet av Socialstyrelsens nationella riktlinjer för sjukdomsprevention 2011 där MI ingår som ett verktyg och rekommenderas. I en sökning 2013-03-01 fanns det ingen systematisk översiktsartikel där man utvärderar MI inom den sjukgymnastiska vården. En systematisk litteraturstudie efter PRISMA och CONSORTs standards genomfördes mellan 2013-03-15 till 2013-05-01 med sökning i databaserna Pubmed, Cinahl, PsychInfo och PEDro. En randomiserad kontrollerad studie, en pilotstudie och en pågående studie hittades. En meta-analys var inte genomförbar på grund av för litet resultat. Resultatet av studierna visade signifikans för vissa utfallsmått till fördel för MI interventionen men hade metodologiska brister. Fler högkvalitativa kontrollerade studier är önskvärda med betoning på samtidig utvärdering av MI kompetens och tillämpningen av Minimal Clinical Important Change som komplement till signifikansmått.

Systematic review registration number: CRD 420130004341, PROSPERO register

Sökord: Motiverande samtal, Sjukgymnastik, Systematisk litteraturstudie, Effektstudie

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# INTRODUCTION

## **Why this review is important.**

Motivational Interviewing (MI) has gained popularity among Swedish physiotherapists with an ambition to improve their communication skills in lifestyle counseling and to attain a better adherence to physiotherapy. The use of MI is also supported among politicians in the healthcare sector. To date, no systematic review addressing the effects of MI in physiotherapy can be found in major databases. In the epoch of evidence-based medicine, there is a need for such a review.

## **Physiotherapy**

Physiotherapy (PT) is found in a variety of healthcare settings and can be condensed to “*develop, maintain and restore maximum movement and functional ability throughout the lifespan*”(1) Besides passive treatment modalities and supervised exercise, a common intervention is giving advice or home exercises to enhance movement and function or periodically limiting advice such as not to aggravate symptoms. For the interventions to be efficient they ought to be adhered to.

Adherence is defined as “the extent to which patients follow the instructions they are given for prescribed treatments” and is sometimes interchangeable with the term compliance which may have a more subordinate nature (2,3). Adherence to medical treatment in the chronically ill is estimated to be as low as 50% (4) Several studies (5-9) describe similar adherence challenges within physiotherapy listing patients barriers to adherence like low level of physical activity, low self-efficacy, high level of depression, helplessness, anxiety, and worsening of pain to name a few. Different adherence enhancing interventions have been evaluated such as written information, self-management interventions, trans-theoretical model based counseling, individual exercise video and cognitive behavior (CB) intervention. There seem to be conflicting evidence for some of the above named interventions and strong evidence that CB does not increase long term adherence  $\geq 6$  months with exercise (5–9).

In 2011 the Swedish National Board of Health and Welfare endorsed MI in the “National Guidelines for Disease Prevention” where insufficient physical activity is one of the main topics (10). This has led to a mounting interest in MI training and its implementation among Swedish physiotherapists.

## **Motivational Interviewing**

Motivational Interviewing is a client-centered style of counseling to elicit behavior change (11). MI was developed by Miller and Rollnick, inspired by Carl Rogers’s thoughts about the client-centered conversation and Prochaska’s trans-theoretical model of change (12), but without necessarily having them as a founding theory. When created in the ’80s it was initially applied in treating substance abuse but has since been implemented with emerging evidence in other areas such as compulsive gambling, correctional treatment, medicine adherence and health-promoting to name a few (13–20).

Fundamental concepts in giving MI are to express empathy, reflecting discrepancy between behaviors and values, non-confrontational attitude of resistance to change and enhance confidence in the client’s ability to behavioral change. It is emphasized that it is primarily the “MI spirit” and empathy in the counseling that are of great importance for success. MI spirit is a collective term for a spirit of equality, to elicit change in the client, and a basis for the autonomy of the individual i.e. freedom of the patient to decide whether or not to receive advice (21).

Rudimental MI education consists of a 2-3 day workshop, but studies show that a longer period of practice is needed to develop MI skills and that feedback is essential for progress. Feedback can be done by evaluating recorded conversations (22–24). One way to evaluate MI fidelity i.e. the amount of MI a conversation has is by having it coded with the Motivational Interviewing Treatment Integrity Code (MITI) (25). MITI is an evaluation manual by which a trained encoder,

in the case of MITI, only focuses on the MI provider. It is comprised by two parts, one rating the overall impression of the conversation in five domains (Evocation, Collaboration, Autonomy, Direction and Empathy) by a 5 point Likert scale while the other counting various statements like giving information, utterance adherent vs. non adherent with MI, simple vs. complex reflections, open vs. closed questions and reflection/question ratio. The sum score is interpreted by using a set of thresholds divided to the acceptable “Beginning Proficiency” or the premier “Competency”. While awaiting validated thresholds they are to date set by expert opinions.

### **MI, PT and The Movement Continuum Theory - Compounding Theories**

One theory in physiotherapy is the Movement Continuum Theory as first described by Cott & Finch (26) and Allen (27). It theorizes that: “Movement is essential to life and occurs from the cellular microscopic level to a person acting in society. Movement is influenced by physical, psychological, social, and environmental factors. A person has a maximum achievable movement potential (MAMP), a preferred movement capability (PMC) and a current movement capability (CMC). The physiotherapist strives to minimize the difference between PMC and CMC through treatment, self education and modifications of the environment.” This conforms to the same principle in MI that a key to succeeding in behavior change is to illuminate the client’s discrepancy between values and behavior and encourage movement towards that change concluding that motivation is a prerequisite.

As MI is recognized to enhance behavior change and is increasingly implemented within physiotherapy to address adherence and life style challenges, it is due time to inventory the current research pool. MI is an evidence-based intervention in some settings, but when used in others, like PT, it needs further evaluation. To date no review has been made on the topic.

### **Aim**

The aim of this review is to explore the current knowledge base about how MI affects outcome in physiotherapy and may shed light on future research needs.

### **Objectives**

The objectives of this systematic review are to:

- Identify and assess clinical trials evaluating the effect of MI on any outcome within any discipline of physical therapy and present the findings.
- Identify the extent of MI training and/or MI fidelity of the MI providers in the included studies.

## **METHODS**

Before taking on this review a pre-study was conducted searching for similar reviews. The search terms used was Motivational Interviewing AND (physical therapy OR physiotherapy) in the following databases in 2013-03-01: Database of Abstracts of Reviews of Effects (DARE), Cochrane Database of Systematic Reviews (CDSR) National Institute for Health and Clinical Excellence (NICE) and PubMed (28–31). One review was found looking at MI and musculoskeletal health from 2012 identifying five studies of which only one included physiotherapists (32).

The outline for this review follows the PRISMA statement for systematic reviews (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) which is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. It consists of a 27-item checklist to aid the reporting of systematic reviews of randomized controlled trials in particular but also evaluation of interventions. The PRISMA statement is not a quality assessment tool but a standard of reporting (33).

Methodological quality assessments of the studies included used the CONSORT statement (Consolidated Standards of Reporting Trials) with the extension for non-pharmacological

treatment. It is an evidence-based, minimum set of recommendations for reporting randomized controlled trials. It is both used as a quality assessment tool and as a reporting checklist to support authors of clinical research. The extension for non-pharmacological treatment considers methodological difficulties such as blinding challenges, care givers expertise and volume of care centers as a potential risk of bias. The statement consists of a 23-item checklist (34,35).

Searches were carried out during the period 2013-03-15 to 2013-05-01 in the electronic databases Pubmed, Cinahl, PsychInfo and PEDro. Initially different MeSH and search terms for the physiotherapy discipline were explored to verify a correct population search strategy on their own. Motivational Interviewing is a MeSH term itself and need no further exploration but may be discussed due to its relatively new role as such. It was introduced in Medline 2013 and replaced the former term Nondirective Therapy (1996-2012).

Selected terms (Table 1) in combination were searched both as free text and as MeSH to get an initial broad search. The search strategy and MeSH terms were discussed on several occasions with experienced librarians at Karolinska University Library as to enhance internal validity. As the search topic was hypothesized not to have been very well studied MeSH terms chosen were as high as possible in the hierarchy to achieve a broader more including search than lower on the scale and more specific terms. A description of the search in Pubmed is presented in Table 2 and searches for respective database are outlined in Table 3.

Potentially relevant articles were identified by title and/or abstract. Studies with inadequate information in title and abstract were initially included to the second assessment for a more thorough full-text analysis. In one study no profession could be identified. E-mail correspondence with the author provided information that the staff were human movement scientists and thus excluded (36).

The first database searched was Pubmed. The findings from that search created a foundation of potentially relevant studies and duplicates from the other databases were not added to the pool of relevant articles. In Cinahl some different search terms were used accepting the suggested subject term. When the final 3 articles were identified a “related citations” search was carried out for each article in Pubmed.

### **Inclusion criteria**

The inclusion criteria structure was derived from PICOS (37) Table 1. The search was limited to clinical trials on humans published in the English language. No date limit for the studies was set.

- MI provided by anyone in addition to physiotherapy care of any sub discipline with outcomes assessed by a physiotherapist.

### **Exclusion criteria**

- Physical therapy interventions or assessments carried out by non-physiotherapists.

### **Correction of criteria**

As few studies were included the inclusion/exclusion criterions were changed to include pilot trials and study designs during a second search as a way to look ahead for upcoming trials.

**Table 1.** PICOS and related MeSH terms

<b>PICOS</b>	<b>Research Question</b>	<b>MeSH term/s</b>
<b>Population</b>	Patients undergoing physiotherapy and/or Physiotherapists	Physiotherapists, Physiotherapy
<b>Intervention</b>	Motivational Interviewing in addition to physiotherapy	Motivational Interviewing, Nondirective Therapy Physical therapy, physical therapy modalities, physical therapy specialties, physiotherapists, rehabilitation, exercise, exercise therapy, Patient Compliance
<b>Control/Comparison</b>	Appropriate control	No search term needed
<b>Outcome</b>	Depending on intervention	No search term needed
<b>Study Design</b>	Clinical trials	See limits

**Table 2.** Search in Pubmed 2013-03-15-2013-05-01 limited to clinical trials

<b>Search terms</b>	<b>Results</b>
Motivational Interviewing (physical therapy OR physiotherapy)	36
Motivational Interviewing physical activity	76
Motivational Interviewing rehabilitation	101
Motivational Interviewing (adherence OR compliance) exercise	18
Motivational Interviewing exercise therapy	28
Motivational Interviewing physiotherapy	11
Motivational Interviewing (physical therapy modalities)	11
Motivational Interviewing physiotherapist	4
Motivational Interviewing musculoskeletal rehabilitation	0
Motivational Interviewing (pilot OR design)	222
Nondirective Therapy AND Physical Therapy Modalities	2

**Table 3.** Search terms and initial results 2013-03-15 – 2013-05-01

<b>Database (results)</b>	<b>Search terms</b>
<b>Pubmed</b> (509 of which 40 selected, 24 +1 pilot+1 design when duplicates removed)	Motivational Interviewing, rehabilitation, physical therapy, physiotherapy, physiotherapist, exercise therapy, patient compliance, physical activity, musculoskeletal rehabilitation, physical therapy modalities
<b>Cinahl</b> (179, none selected)	Motivational Interviewing, physiotherapy, physical therapy services, exercise therapy, musculoskeletal, physical therapy modalities
<b>PEDro</b> (34, none selected)	Motivational Interviewing
<b>PsychInfo</b> 235 none selected	Motivational Interviewing and physical therapy physiotherapy, musculoskeletal, exercise adherence exercise

## RESULTS

An overview of the search procedure and results are show in Figure 1.

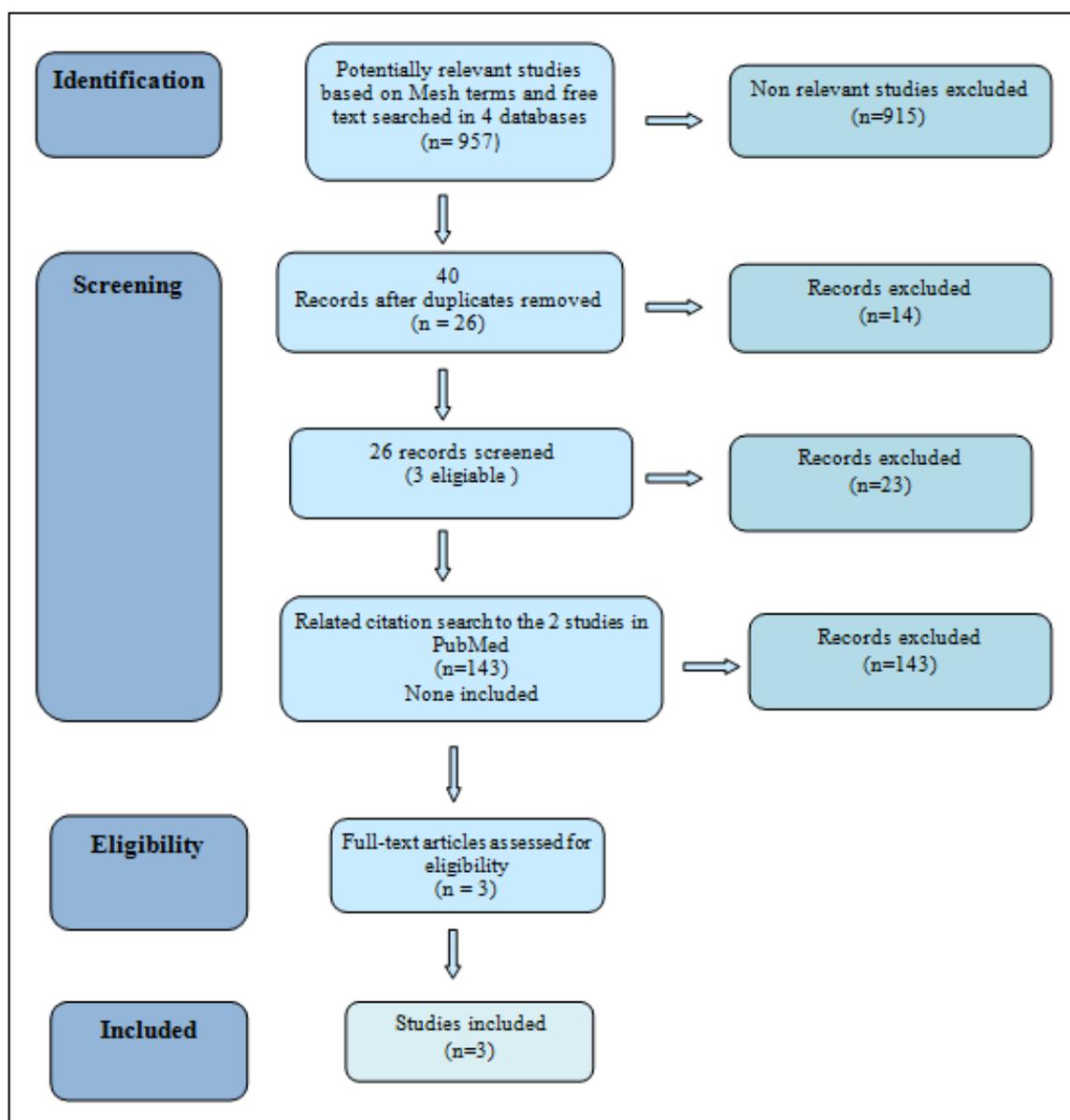


Figure 1. Flow chart of search procedure and results.

The only studies found through this rigorous search were one RCT, one Pilot RCT and one registered study design. The studies will be presented narratively followed by a discussion and a summary of CONSORT comments. For more explanatory details of the items see the CONSORT-statement (35)

**Motivational enhancement therapy in addition to physical therapy improves motivational factors and treatment outcomes in people with low back pain: A randomized controlled trial. Vong et al. 2011 (38)**

This study evaluated the effect of an additional Motivational Enhancement Therapy (MET) intervention including MI skills to physiotherapy during eight weeks in people with chronic low back pain. The MET intervention was created on the base of MI strategies and was beforehand validated in a pilot study. Six physiotherapists were randomized into two groups. The MET group (3 PT's) received eight hours of training in MI/MET and the other was given general communication skill training. Both training sessions were held by a psychologist. The PT's were encouraged to practice their skills on pain patients during two weeks while supervised by a MI trained person with a MET-checklist evaluating the amount of implementation of MET skills. Patients were randomized to either MET+PT or standard PT. PT interventions were ten 30-minute sessions including 15 minutes of high frequency inferential therapy 80/100 Hz over the lumbar spine and specific exercises. The intervention group received MET during the PT sessions while the control got ordinary communication.

Outcome measures were primarily: Motivational status assessed with PRES and PSEQ questionnaires and secondary: pain intensity assessed with VAS, physical function with ROM, strength with a lifting test, subjective disability with RMDQ, Quality of life with SF-36 and exercise compliance with numbers of home exercise attended. All outcomes but the PRES and exercise compliance were evaluated at baseline, after session 5, 10 and at the one-month follow up. The MET + PT group produced significantly greater improvements than the PT group in 3 motivation enhancing factors; CI = 0.95% proxy efficacy (P=.001, CI= 0.15 - 0.50), working alliance (P=.001, CI= 0.15 - 0.47), and treatment expectancy (P=.011, CI= 0.04 - 0.29). Furthermore, they performed significantly better in lifting capacity (P=.015, CI= 1.10 - 10.03), 36-Item Short Form Health Survey General Health subscale (P=.015), and exercise compliance (P=.002, CI= 2.91–11.23) than the PT group. Authors discuss the study's under power, limited follow up, high dropout rate, inadequate training of MET in recommendation by MI Network of Trainers and no external validity for patients with depression.

**Comments on the article by Vong et al. 2011 (38)**

The study design fails on some points. Great effort was put into the creation of the MET intervention but in comparison to that effort inadequate training for the physiotherapists was given. The attempt to standardize the MET during two weeks of training valuated by the amount of MET in percent, with a not validated checklist, given before the study gives no assurance of the MET provided in the study. No motivation, besides that it is commonly administered in Northern Ireland, is given to the administration of 15 minutes of inferential therapy once a week. The use of parametric statistical analysis on ordinal data might be common but must be discussed of which is lacking. Some of this study's results are discussed and consisted to other studies alike (39–42). When doing so it is crucial that design, interventions and outcomes are equivalent. Scrutinizing the references shows that the referred studies differ in the above mentioned ways. This study lacks internal and external validity as well as power and cannot be repeated due to lack of standardization of intervention. CONSORT evaluation summary is found in table 4.

**Table 4.** CONSORT evaluation with extension for non-pharmacological trials. Items lacking comments equals the information was satisfactory by standards and found at the page noted.

Item	Comment <b>Vong et al. 2011 (38)</b>	Reported on page
1		176
2	No background of CLBP or exercise only prevalence.	176
3	No information about the setting more than an outpatient clinic.	177
4		177-178
4A		177
4B		177-178
4C	Adherence to protocol not controlled for.	
5		177
6		178
7	No explanation to sample size determination or stopping rules.	
8		177
9		177
10	No information about who conducted randomized, allocated or enrolled participants.	177
11A		177
11B	Method of blinding not explained.	
12		178
13	No information of how many participants was treated by each PT	177-178
New		177-178
14	No dates of enrollment or study presented.	178
15		177+179
16		178
17	No CI for subgroup SF36 GH	179-181
18	Subgroup analysis SF36 GH	
19		180
20		180-182
21		180-182
22	No external validity	182

**Motivational Interviewing may improve exercise experience for people with multiple sclerosis: A small randomized trial. Smith et al. 2012 (43)**

This study evaluated the effects of MI on adherence and personal experience to an exercise program in a small sample of patients with multiple sclerosis (MS). They hypothesized that MI in addition to exercise would not affect adherence to structured exercise and that MI would result in a better exercise experience with a better affect, lesser fatigue and lower perceived exertion during the same. Patients were recruited via advertising and randomized in to two groups who where both offered an eight-week exercise program supervised by a physiotherapist consisting of aerobic, resistance and balance training three days per week. In addition, the intervention group received 3 MI sessions lasting between 30-60 minutes with a social worker evenly spread out during the eight weeks while the control group received general health-talk sessions with the same social worker with equal duration controlling for the social contact the intervention group received.

Outcome measures were: objective exercise adherence by attendance, affect during exercise by The feeling scale, effort by Borg’s Rating of perceived exertion, enjoyment by The enjoyment scale, fatigue by Mental and Physical fatigue scale, which were all completed after every

exercise session. Research personnel who collected the outcome measures and exercise supervisors were blinded to the participants' allocation. Every MI or health-talk was audio recorded and coded with MITI by two independent raters to monitor MI fidelity and proficiency as well as controlling the non-MI talks for unintentionally containing MI qualities.

Results showed that the MI provided was acceptable and the health-talks were low under MI quality. Significant findings favoring the MI group ( $t$ = interdependent  $t$ -test,  $d$ = Cohen's  $d$  = pooled standard variation) in perceived exertion [ $t(11) = 2.34, p = .02, d = -1.32$ ], affect [ $t(11) = 2.01, p = .035, d = 1.19$ ], and physical fatigue [ $t(11) = 3.03, p = .005, d = -1.71$ ]. The raters coding the MI sessions had high inter-rater reliability. In general the study was underpowered due to low number of participants but three measures reached significance; perceived exertion, affect and physical fatigue in favor to the MI group and no group difference in adherence to exercise which was high in both groups.

### Comments on the article by Smith et al. 2012 (43)

This pilot study is excellent in view of its design in monitoring MI fidelity and proficiency by independent, inter-rater reliable raters and not only assessing the effects on the described primary outcomes but also considering the effects of the in-session therapist behaviors on exercise experience and adherence. Having the same person giving non-MI counseling will be a source of bias where there is risk of offering a worse than normal counseling while making sure no MI is offered. There is also a risk of bias not presenting details concerning the exercise program and procedures in its implementation. Outcome showed less perceived exertion, fatigue and more joy in favor for the MI group but gives no details of how the exercise intensity was standardized and carried out. Could the MI group for some reason have put in less effort? The statistical analysis was made with both parametric and non-parametric test after removal of outliers but only chosen to present the parametric analyses. Even though both statistical methods were interpreted robust it can be problematic and tends to fishing for  $p$ -values. As this is a pilot study no evidence summation can be given. In future larger studies these details can be attended. CONSORT evaluation summary found in table 5.

**Table 5.** CONSORT evaluation with extension for non-pharmacological trials. Items lacking comments equals the information was satisfactory by standards and found at the page noted.

Item	Comment	Reported on page
	<b>Smith et al. 2012 (43)</b>	
1	No description of center, care providers or blinding in abstract.	99
2		99-101
3	No eligibility criteria for center or description of location provided.	103
4	No protocol for exercise program provided or referred to.	102-103
4A	No protocol for exercise program provided or referred to	103
4B	No protocol for exercise program provided or referred to	103
4C	No protocol for exercise program provided or referred to	103
5		101-102
6		103-104
7	No information concerning sample size decision, stopping rules.	
8	No description of randomization procedures.	102
9	No description of randomization procedures.	
10	No information of who randomized, allocated, enrolled, and assigned participants.	
11A		103
11B	Blinding procedure and maintenance not described.	103

**Table 5 Continued**

Item	Comment	Reported on page
12		104
13		102
New		103
15	No dates of enrollment or study provided.	
16	No intention-to-treat information.	102
17		104-106
18	Reliability estimates and MI proficiency	105
19	No reporting of adverse events.	
20		106-108
21	Not possible to generalize due to lack of power.	
22		108

**Ongoing study****LEARN 2 MOVE 7-12 years: a randomized controlled trial on the effects of a physical activity stimulation program in children with cerebral palsy. Van Wely et al. 2010 (44)**

This study is planning to evaluate a physical activity stimulation program based on Motivational Interviewing compared to standard physiotherapy in 7-12 year old children with spastic cerebral palsy. 50 children with Gross Motor Function Classification Scale (GMFCS) level I-III will be randomized either to a control group with continuation of pediatric physiotherapy or intervention group undergoing a 6 month lifestyle intervention with the aim to stimulate an active lifestyle through MI (maximum 4 sessions) together with a four month fitness training program aiming at muscle strength and cardiovascular endurance. Primary outcomes are physical activity and secondary outcomes are fitness, capacity of mobility, social participation and health-related quality of life. The study was conducted between September 2009 and February 2012.

**Comments of the article van Wely et al. 2010 (44)**

As this study is not yet published it will not be evaluated but commented. The study design is detailed and rigorously planned standardizing details in the interventions and presenting it very clearly. The only thing lacking is fidelity evaluation of the MI intervention, which is hastily mentioned.

**Ethical considerations**

All participants in the chosen studies had given informed consent before enrolling but the study of Smith et al who did not report of any ethical approval as the others.

**DISCUSSION**

In this review surprisingly few studies on MI within physiotherapy care were found considering its increasing use. The fact that the process to carry out a trial, writing the report and being accepted for publication may take several years, it is even more surprising to find only one registered study design.

**Method**

Initially I found a number of potentially eligible studies assessing outcome measures sometimes found in physical therapy settings, which later were excluded by reason that other professionals than PT's were the assessors. Some studies were strictly laboratory tests conducted by movement scientists. Others included nurses, general practitioners, physical activity counselors, exercise professionals, physical activity advisors and physical activity specialists. I suspect this has to do with national differences as in Sweden there are seldom any other professionals than PT's working physiotherapeutically within health care and even more rarely doing studies in the

PT area. One could argue that the conclusions of this study are false because there may exist trials on some outcomes that PT's use. The focus of *this* study has been on PT's and whether MI could add benefits to their patients. It could be of interest for a future study to include other professions working in related settings and then with a specific outcome question like exercise adherence or strength for example.

A limit to this study is of course the single-author perspective. As an effort to increase internal validity, fellow students, my tutor and university librarians have assisted and acted as co-authors giving helpful thoughts. Conducting a systematic review and not covering all available databases leaves a possibility of missing valuable information. There is also a potential risk with my choices of search terms that trials were not found. I have chosen to be very general in my search initially with the possibility to narrow it down but since the sparse findings this was not necessary.

An interesting finding was that no other database of the chosen could add unique material to the first search in Pubmed. AMED is an unsearched database that could have been of interest but Karolinska University Library does no longer engage with it rendering me without access. According to the librarians I spoke with, Pubmed covers most of AMED's contents. I have deliberately not searched for "grey" literature with the belief that non-trials would not help to answer my question. In this study I have used the CONSORT statement to evaluate the RCT's, which have been satisfactory. If I had had a larger number of results another tool might have been more user friendly maybe with the risk of being less thorough. I would have chosen the GRADE system, which gives a numeral grading of evidence and is thus easier to present in tables.

## **Results**

Both weaknesses and strengths in the included studies summarize research challenges. If interventions are left unstandardized or unreported, conclusions will be hard to draw. In the included studies as well as in many others, a common finding in statistical analysis is the use of parametric tests on ordinal data typically derived from questionnaires with Likert scales or Visual Analogue Scales (VAS). These data have no mathematical properties whatsoever. Anxiety checked in box 7 can never be interpreted as more than twice the amount of anxiety as box 3. 60mm of pain can never be claimed to be double the pain as 30 mm. So how can we interpret the significant results from these studies? Just because large parts of the scientific community have misused statistics for years it gives no carte blanche to continue when there are non-parametric alternatives like Svensson's Method (45).

One way to reduce the focused obsession on significant p-values (which are important in one way) when using patient reported outcomes (PRO's) is to use questionnaires evaluated with Minimal Clinical Important Change (MCID) which is a threshold value for the minimal change that the patient perceives as meaningful and worthwhile. If statistics are significant but patients hardly feel the difference is the intervention of any good? Apparently this is no bulletproof method for every case, but the more research being made on the PRO's the better accuracy we may find and the more clinically relevant the findings may be (46,47).

## **Future research and MI fidelity**

If one really wants to assess MI within physiotherapy care, future high quality MI research will need more resources and commitment due to the fact that MI fidelity will have to be controlled for and preferably as Smith et al did with two independent reliable coders. The fact that MI education is still under evaluation and development (48) should increase its treatment fidelity supervision in trials.

One way to evaluate treatment fidelity is in a coding laboratory. Since 2005 there is one laboratory in Stockholm, MIC Lab (49) associated with Karolinska Institutet. MIC Lab is one of

its kind in Europe which evaluates professional MI-sessions at cost price. In order to ensure that assessments are valid and reliable great emphasis is placed on inter-rater reliability with continuous calibration of the coders. The using of a coding laboratory in MI research has some advantages. It would, by no means, be cost effective to create the high level of rater competency and systematic control of validity and reliability for just one project equivalent to the existing competency of a laboratory. I would just take too long and cost too much. Using external independent assessors also increases internal validity. Another use of the coding laboratory outside the field of research is the evaluation and quality assessment of professionals using MI. This competence standardization is exemplary as to assure that the MI-providers actually give MI and nothing else. Worst case scenario could be that MI as a method devaluate in some settings and may be regarded as a passing fad.

Furthermore it is important to continue to evaluate MI in different settings depending on the MI-receiver, i.e. urban vs. rural setting, in different cultures and socioeconomic levels. Are there language and cultural barriers to successfully administer MI? Some studies among Thai, African-American, Hispanics/Latinos and Surinamese have shown benefits from adapting MI both culturally and socially (50–54).

### **Ethics**

As this is a review no intervention on humans were conducted thus no ethical approval was needed. Ethics is one of the pillars of which science lies upon. It is therefore remarkable that no item considering ethics is included in the otherwise so thorough CONSORT statement. When conducting studies and exposing participants (or not) to interventions of any kind, an ethical approval from an independent board is mandatory. Ethical reasoning is not only obviously expected but also gives an altruistic depth to the research remembering us to whom we actually are doing this research for. In the case of MI and its implementation it is from an ethical perspective crucial that patients can be offered effective interventions if they exist as well as not implementing unevaluated methods in large scale. In MI education, efforts of achieving acceptable treatment fidelity should be made as to avoid that funders, providers and patients falsely believing that MI was carried out.

### **CONCLUSION**

The result of this study suggests that there is today no existing convincing evidence that could tell whether MI has an effect on outcomes within physiotherapy care or not. As it is implemented in clinical settings and praxis in disease prevention, evaluation should be given more attention within the physiotherapy setting. Further well-designed controlled trials are warranted with emphasis on transparency, standardization and concurrent evaluation on MI fidelity. P-values presented with MCID and appropriate statistical analyses are requested.

### **FUNDING**

This study has had no funding. Database access was supplied through Karolinska University Library.

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