A SYSTEMATIC REVIEW ON THE EFFECTIVENESS OF MOTIVATIONAL INTERVIEWING AND EXERCISE ON LOW BACK PAIN

BY

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CERTIFICATION

This dissertation by Abioke Uchechukwu Bethel is accepted in its present form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

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DEDICATION

To the most beautiful person in the world, whose love is forever inscribed in my heart, Mrs Peace Udokamma Abioke.

ABSTRACT

Background: The number of persons suffering from low back pain will rise in the future, especially in low- and middle-income countries. The treatments available for low-back pain are not sufficient enough to cause an effective change in the long-term. Hence, there is a growing recognition of the need for a more comprehensive, patient-centered and behavioral-changing approach.

Objective: To determine the effectiveness of motivational interview on patients with low back pain.

Method: Included in this review were study population of adults aged 18 and above. Randomized Controlled Trials (RCTs) and Non-Randomized Controlled Trials (non-RCTs) that explored the effectiveness of Motivational Interview on Low Back Pain. A detailed search of 7 databases was conducted. Data were selected and extracted using the Microsoft Excel Spreadsheet 2010 version following the eligibility criteria. To assess the potential risk of bias in each study, two assessors independently assessed the eligible studies using the revised Cochrane risk of bias tool for parallel RCTs. A review protocol was developed and registered in the PROSPERO database (ID CRD42023444806). A narrative synthesis was used to present findings.

Results: 2 RCTs and 1 non-RCT was eligible from the narrative synthesis. Motivational interview interventions included counselling, motivational programs and group/individual discussion sessions. Motivational interview had a significant effect on pain among patients with low back pain relative to the control interventions. All the studies had a good methodological quality.

Conclusion: Motivational Interview shows a beneficial effect in reducing low back pain and in increasing functional status in patients with low-back pain in comparison with other interventions used in the systematic review. However, current evidence is insufficient on the effect of motivational interview on pain in patients with low back pain. More large scale RCTs are needed to evaluate motivational interview on pain in patients with low back pain.

Keywords: Low back pain, motivational interview, quality of life, functional status.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Research

Low back pain (LBP) is a common musculoskeletal condition that affects about 7.5% (about 577.0 million) of the global population (Wu, 2017). Its prevalence globally varies from 59 to 84 percent. In Africa, one study reported a mean prevalence of 32 percent and a one-year prevalence of 50 percent. In Nigeria, community-based studies have reported a prevalence ranging from 20 to 44 percent. The prevalence of low back pain is high worldwide, with estimates suggesting that up to 80% of individuals will experience low back pain at some point in their lives (Hoy et al, 2012). Low back pain can be acute (lasting less than 12 weeks) or chronic (lasting more than 12 weeks) and can cause significant impairment in functioning (Louw et al, 2007). It can also be mechanical (caused by traumatic events) or non-mechanical (due to infection or malignancy).

Low back pain has been associated with certain risk factors. The risk factors include heavy physical work, frequent bending, twisting, lifting, static postures such as prolonged sitting, psychological factors related to work such as stress at work, and low job satisfaction. It can be caused by various factors such as muscle strain, ligament sprain, herniated disc, degenerative disc disease, spinal stenosis, or poor posture. It is a leading cause of disability which has a significant social, economic, and healthcare implications (Foster et al, 2018). Low back pain can cause significant physical, social, and mental disruptions in an individual's daily life, including their ability to work. The most common reason for early retirement is low-back pain. The prevalence of LBP increases with age till 80-89 years, younger people are also impacted and more frequently during their peak earning years.

Early retirement has a massive societal impact in terms of direct health-care costs as healthcare benefits are reduced making access to healthcare nearly impossible because of financial constraints. (Geyer et al, 2022). LBP is responsible for high treatment costs, frequent sick leave, prolonged back pain and potentially sometimes job loss which may lead to psychological problems like depression. Although only a small minority of patients with LBP in primary care report significant work-related disability, it is recognized that this small proportion is very costly and contributes to the musculoskeletal burden requiring incapacity payments in the UK (Traeger et al, 2019).

Low back pain (LBP) can cause a range of physical and psychological symptoms, including anxiety, depression, stress-related disorders, fear-avoidance beliefs, deconditioning, and decreased function in daily activities, work and even sexual function which can affect overall well-being (Grabovac et al, 2019). LBP has been proven to have a great negative impact on the QOL (Galozzi et al, 2019). Blue-collar workers are more likely to develop LBP than white-collar workers because they perform tasks in standing posture, and have more possibilities to adopt other postures. In a detailed analysis of Work-Related Musculoskeletal Disorders (WRMSDs) among butchers in Kano Metropolis of Nigeria, WRMSDs are prevalent among butchers in Kano metropolis, with low back pain being the most common. (Bashir et al, 2016).

Several approaches have been used to manage LBP, including pharmacological interventions, physical therapy, exercise, and psychological interventions (Foster et al., 2020). LBP patients may receive treatments from the full spectrum of conservative, pharmaceutical, non-pharmacological, traditional, and complementary healthcare interventions in addition to invasive interventions. Exercise, manual therapy, traction, acupuncture, transcutaneous electrical nerve stimulation (TENS), spinal cord stimulators, mattresses, orthotics, back supports, biofeedback, spinal injections, and surgery are some of the treatments available. However, the effectiveness of these interventions can be limited.

Furthermore, best evidence recommendations for patients with LBP have not been properly translated into everyday clinical practice. However, the most under-reported limitation is adherence to treatment. Non-adherence to treatment often affects patients' outcome negatively. Patients with non-specific LBP have lower adherence rates than patients diagnosed with disc herniation (Bashir et al, 2022). For the majority of patients, those with non-specific low back pain cannot be given a clear diagnosis. The reality is that the treatments available produce small effects, often only in the short term, and none appear to effectively change long-term prognosis (Foster et al, 2011). Hence, there is a growing recognition of the need for a more comprehensive, patient-centered and behavioral-changing approach.

Motivational interviewing (MI) is a patient-centered communication technique that has shown promise in promoting behavior change in various health-related conditions, including chronic pain management (Miller et al, 2018). MI is designed to enhance intrinsic motivation and empower patients to set and achieve goals related to their health behavior (Rollnick et al, 2008). The function of MI on patients with low back pain cannot be over emphasized as MI aims to increase patient motivation to make positive changes in their behavior, such as engaging in regular physical activity, adhering to a prescribed exercise program, or adopting a healthy lifestyle (Miller, 2013). MI utilizes techniques such as empathy, reflective listening, and exploring ambivalence to help patients clarify their values and goals, and increase their motivation for change (Miller et al, 2013). Patients with low back pain may experience ambivalence about making changes to their lifestyle, such as reducing sedentary behavior, modifying their diet, or adopting a regular exercise routine.

MI provides a non-judgmental and empathic environment for patients to express their ambivalence and explore the pros and cons of behavior change, which can help them resolve their ambivalence and move towards positive changes (Rollnick et al, 2008). MI also help bring about self-efficacy, or the belief in one's ability to successfully perform a behavior and it is an important factor in

behavior change. MI can help patients identify and build on their existing strengths and skills, and enhance their self-efficacy in managing their low back pain through adopting healthy behaviors, such as engaging in regular physical activity, practicing proper body mechanics, and adhering to a prescribed treatment plan (Rubak et al, 2005). Emerging evidence on motivational interviewing in patients with low back pain has found improvement in self-efficacy, increased functional outcomes reduced disability and improved adherence to exercise in patients with low back pain (Jensen, 2018).

1.2 Statement of The Problem

The primary factor contributing to disability worldwide is low back pain. Since 1990, LBP-related disabilities have become more prevalent globally (WHO, 2020). According to projections, the number of persons suffering from low back pain will rise in the future, and will rise even faster in low- and middle-income countries (Hartvigsen, 2019). There is emerging evidence suggesting that MI may be an effective approach in the management of chronic conditions with improvement in self-efficacy, adherence to treatment, and better health outcomes being noted (Soderlund et al, 2018). However, to the best of the researcher's knowledge there is no systematic review which has evaluated the effectiveness of MI specifically for patients with LBP. Most studies have focused on other chronic pain conditions or have small sample sizes (Gore et al, 2015). Therefore, further research is needed to investigate the specific impact of MI on patients with LBP and to determine its effectiveness as a standalone or intervention in this population.

1.3 Research Question

What is the effectiveness of motivational interview on patients with low back pain?

1.4 Aim of Study

The aim of this study is to assess the effectiveness of motivational interview on patients with low back pain as reported in literature.

1.4.1 Specific Objectives

The specific objective of this is:

- To systematically review the literature on MI on low-back pain.
- To determine the effectiveness of MI on low-back pain.

1.5 Significance of Study

i. **Healthcare Professionals**

The findings of this study could have important clinical implications for healthcare professionals, including doctors, physiotherapists, and other healthcare providers who are involved in the management of patients with low back pain. If this study demonstrates that motivational interviewing is effective in improving patient outcomes, it may lead to the incorporation of motivational interviewing techniques in the clinical practice for managing patients with low back pain. This can potentially enhance the quality of care provided to patients and could subsequently improve their overall well-being.

ii. Researchers

This study could add to the existing body of evidence on the effectiveness of motivational interviewing in the management of low back pain. Evidence-based practice is an important approach in healthcare, and the findings of this study could potentially contribute to the development of clinical guidelines or best practice recommendations for the management of patients with low back pain, based on rigorous research evidence.

iii. Policy-makers

This study could also have implications for the cost-effectiveness of managing patients with low back pain. If motivational interviewing is shown to be effective in improving patient outcomes, it may lead to reduced healthcare costs associated with low back pain, such as decreased healthcare utilization, fewer sick leaves, and improved work productivity. This could have important implications for healthcare policy-making and resource allocation decisions.

iv. For Patients

This study could promote a patient-centered approach to care, as motivational interviewing is a patient-centered communication technique that emphasizes collaboration, empathy, and empowerment. If the study demonstrates that motivational interviewing is effective in improving patient outcomes, it might highlight the importance of incorporating patient-centered care approaches in the management of patients with low back pain, and promote a more patient-centered healthcare practice.

1.6 Delimitations of Study

This study would be delimited to the following:

Participants:

i. This study would include male and female patients.

ii. This study would include patients with age ranging from 18 and above.

1.7 Limitations of Study

This study did not include non-English Language studies and studies that used pharmacological or surgical interventions.

1.8 Definition of Terms

Low Back Pain: refers to discomfort or pain that is localized in the lower part of the back, typically between the ribcage and the gluteal folds (American Academy of Orthopaedic Surgeons, 2019).

Motivational Interviewing: is a collaborative, person-centered approach to communication that aims to elicit and strengthen intrinsic motivation for change in individuals struggling with behavior change, such as addiction or unhealthy habits (Miller & Rollnick, 2013).

1.9 Lists of Abbreviations:

LBP: Low Back Pain.

MI: Motivational interview

QOL: Quality of Life.

CHAPTER THREE

METHODS

3.1 Review

This review was guided using the following preferred reporting items for systematic reviews and meta-analysis (PRISMA) guideline (Page et al., 2020). A review protocol was developed and registered with the PROSPERO database in July 2023 (PROSPERO ID: CRD42023444806).

3.1.1 Study criteria and selection

Inclusion criteria

The PICOT framework is used in this systematic review to structure the inclusion and exclusion criteria for study selection ensuring that the review process is guided by the research question (Methley et al., 2014).

Population: Patients that are adults with a definite medical diagnosis of LBP. Patients with chronic or acute low-back pain (aged 18 and above).

Intervention: Studies reporting the use of Motivational Interviewing in managing patients with low-back pain were included.

Comparison: Usual care or standard care for low-back pain or education were included in this review.

Primary Outcome: Pain was used as primary outcome.

Secondary Outcome: This included improvement in functional status, disability and quality of life.

Type of Study: Full-text and peer-reviewed randomized controlled trials that examine the use of Motivational Interview in the management of low-back pain were included. Studies such as thesis reports and abstracts or studies not published in English were excluded.

3.3 Search Strategy

The following electronic databases were used for the search: Cochrane Library, MEDLINE (via OVID), Allied and Complementary Medicine Database (AMED), Cumulated Index to Nursing and Allied Health Literature (CINAHL) (via EBSCOhost); ProQuest (Health and Medical Collections, Nursing and Allied Health database, PsycINFO), Web of Science core collections and African Journals Online (AJOL), Physiotherapy Evidence Database (PEDro) (From inception to 24th July, 2023). The search strategy was reviewed by an experienced librarian in systematic review methodology. The following keywords, medical headings in combination with specific database search syntax, filters, limiters and Boolean operators were used: “motivational interview" OR “motivational interviewing” AND “low-back pain” OR “LBP” "chronic low-back pain" OR “chronic LBP” OR "acute low-back pain " OR “acute LBP” OR “sub-acute low-back pain” OR “sub-acute LBP” OR “transient low-back pain” OR “transient LBP” OR “recurrent low-back pain” OR “recurrent LBP”. The reference list of all included studies was further searched for other eligible studies. Only full text articles were included, and non-English language articles or grey literatures were excluded.

3.4 Inclusion Criteria

Studies included full-text and peer-reviewed randomized controlled trials and cross-over studies that examined the effects of motivational interview in the management of pain in people with low-back pain.

3.5 Exclusion Criteria

Articles were excluded if they are thesis reports and abstracts or studies not published in English Language. Studies that used pharmacological or surgical interventions to manage LBP in patients with LBP were also be excluded.

3.6 Study Selection

Two reviewers Uche Abioke (UA) and Rev. Sr. Henrietta Fawole (HF), my supervisor and a lecturer in physiotherapy independently screened identified studies for titles and abstracts. Thereafter both reviewers screened eligible full texts against the inclusion criteria. In cases of disagreement, both reviewers discussed and reach a consensus. Where consensus could not be reached, a third author, Mr Yinka Akinrolie (YA), was consulted for final decision.

3.7 Data Extraction

Two authors (UA and HF) extracted the following information independently from all included studies using a pre-piloted data extraction form: name of author, year of publication, study population, participant characteristics, LBP type, pain outcome tool, intervention type, intervention description, control intervention description, findings and implications. Discrepancies were resolved through discussion.

3.8 Quality Appraisal

Two reviewers (UA and HF) independently and later collaboratively assessed the risk of bias for studies using the Cochrane Collaboration's tool for assessing the risk of bias for parallel, cluster or cross-over randomised controlled trials (Higgins and Altman, 2008). In cases where the two reviewers are unable to reach a consensus after discussion, a third reviewer (YA) was consulted. The two reviewers independently conducted a pilot test of the risk of bias assessment to familiarize

themselves with the tool and to ensure consistency. The assessment of quality was determined by the content of the article.

3.9 Data Synthesis

Characteristics of the included studies and any important questions related to the aim of this systematic review was summarized in tables. Due to the inclusion of quasi-experimental study and small number of RCTs available for inclusion, it was not feasible to conduct a meta-analysis; therefore, results were generated through narrative synthesis. Preliminary synthesis involved a descriptive summary of key information extracted from all articles.

3.9.1 Data Management

All the articles found from databases were exported into Covidence systematic review software (2023, Veritas Health Innovation, Melbourne, Australia) and duplicates were removed prior to screening.

3.9.1.1 Ethical Approval

Ethical approval was sought and obtained from the Research and Ethics Committee of the College of Basic Medical Sciences, University of Benin with ethical approval number CMS/REC/2023/413.

CHAPTER FOUR

RESULTS

4.1 Study Selection

In total, searches from databases yielded 2,802 records which were exported to Microsoft Excel (2010 version). Removal of duplicates yielded 1548 articles for Title and Abstract screening. After title and abstract screening, 1523 articles were excluded and 25 articles were left for Full-text screening. Of the 25 articles, 3 trials (4 publications) met the inclusion criteria and were thus eligible to be included in the review (Figure 1).

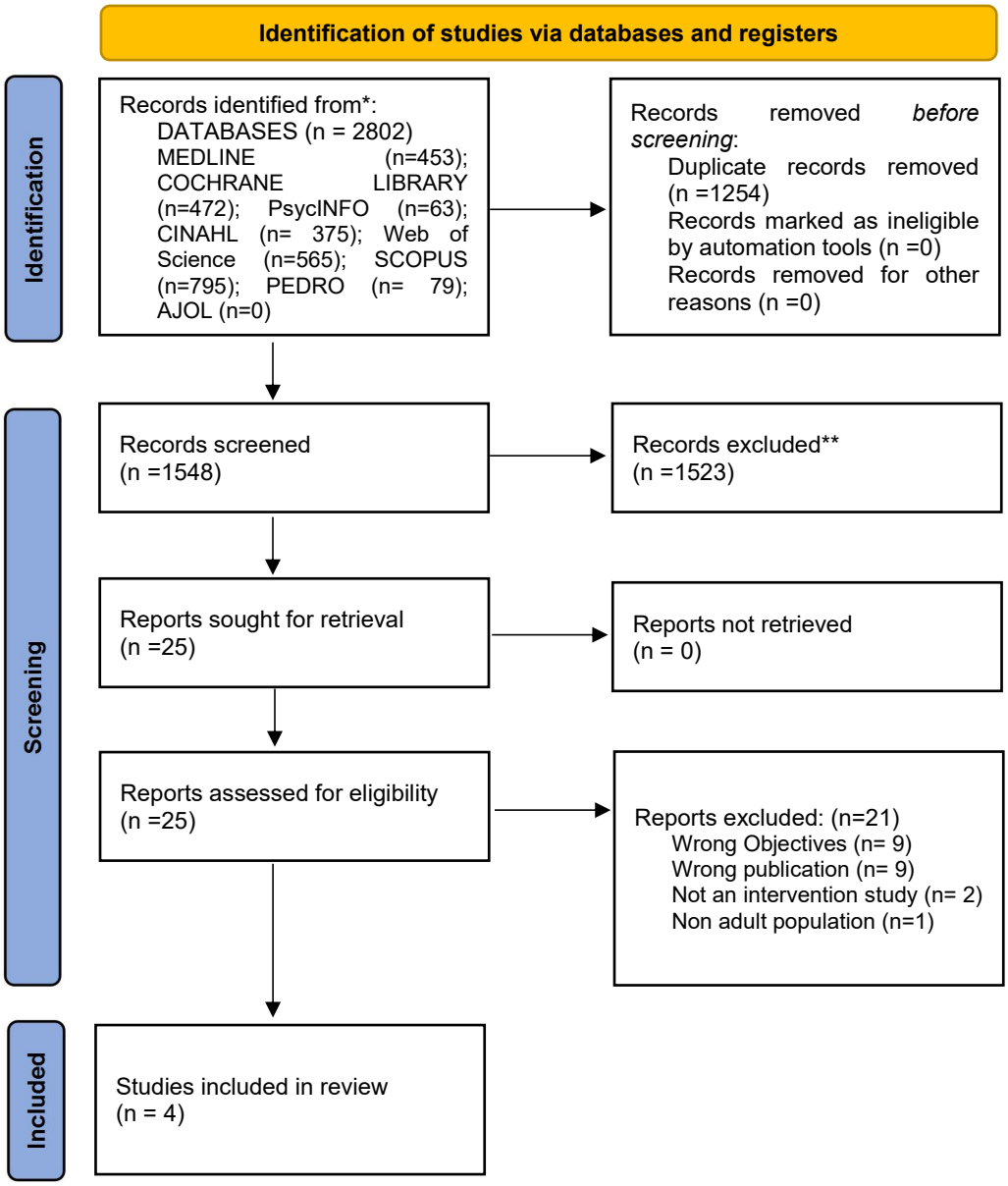


Figure 4.1: PRISMA flow diagram of the study selection process (Page et al., 2020)

4.2 Study Characteristics

The included studies were published between 1998 and 2020. One trial which had two publications was conducted in Austria (Friedrich et al, 1998; Friedrich et al, 2005), one trial in Japan (Shimo et al, 2020) and one trial in Nigeria (Igwesi-Chidobe et al, 2019). The types of LBP included in the trial are Chronic LBP (Shimo et al, 2020 and Igwesi-Chidobe et al, 2019) and chronic & recurrent LBP (Friedrich et al, 1998 and Friedrich et al, 2005). A total of 247 participants were included in the trial and they were aged 18 and above.

4.2.1 Study design

Out of the 3 trials included, one is a pilot randomized controlled trial (RCT) (Shimo et al, 2020), one is a double-blind prospective RCT (Friedrich et al, 1998; 2005) and one is non-randomised controlled trial (Igwesi-Chidobe et al, 2019).

4.2.2 Low Back Pain Interventions

A total number of 3 trials were used for this review and various interventions were administered. The interventions utilized were counselling, motivational program and individual/group discussion sessions. In a trial which included 37 participants who were randomly assigned to either the intervention group (n = 20) or a single 60-minute session, the intervention group was administered a workplace counseling program (Shimo et al, 2020). Counseling sessions were conducted using a motivational interviewing method that each of the program directors had employed on a regular basis in clinical practice. For 12 weeks, instructors visited the workplace once a week and provided each participant with a 15-minute face-to-face individual treatment session during working hours.

The control group received a home exercise regimen which included seven floor stretches, four standing stretches which were held for 20 seconds on each side, three core stability exercises of 10 repetitions each, and ten minutes of moderate-speed walking. Participants were involved in the

program for at least 5 days before gradually increasing the number of steps and walking pace; we provided handouts with weekly textual instructions coupled with graphics to help them grasp the program.

In another trial, participants in the intervention group received a motivational program with five compliance enhancing techniques including extensive counselling and reinforcement technique. The control group received exercise for 25 minutes, 2 to 3 sessions per week for a total of 10 training sessions (Friedrich et al, 1998; 2005). Igwesi-Chidobe et al, (2019) utilised a programme of combined group exercise sessions with group/ individual discussion sessions, informed by cognitive behavioural therapy and motivational interviewing. It was a six-week programme delivered once a week. Each weekly session was based on a different theme and each session had six phases. The control group received the usual care.

4.2.3 Low Back Pain measure

The Visual Analog Scale was used to evaluate pain in the trial by Shimo et al, (2020). The 101-point Numerical Pain Rating Scale (NPRS) was employed by Friedrich et al, (1998). One trial used the 100-point Numerical Pain Rating Scale (NPRS) (Friedrich et al, 2005) and Igwesi-Chidobe et al, 2019 used the Igbo 11-Box Scale (11-BS) to assess pain.

4.2.4 Functional Status and disability Measures

Functional status was measured by 6-min walking distance and seated forward bends (Shimo et al, 2020). Modified Waddell score and finger-to-floor distance was used by a trial (Friedrich et al, 1998(2005)) to measure functional status before and after the intervention. However, functional status was not reported in the non-randomised controlled trial included in this review (Igwesi-Chidobe et al, 2019). Disability was assessed using the Roland-Morris Disability Questionnaire in the trial by Shimo et al, (2020) and Igwesi-Chidobe et al, (2019). The trial by Friedrich et al, (1998) used low back outcome score to assess disability.

4.2.5 Quality Of Life

None of the studies evaluated the effect of motivational interview on quality of life. Table 4.1 shows the characteristics of included studies.

Table 4.1: Data extraction table

AUTHORS (YEAR)	STUDY DESIGN	COUNTRY/SETTING	SAMPLE SIZE	MEAN AGE(SD)	INTERVENTION DESCRIPTION	CONTROL DESCRIPTION	PAIN/ FUNCTIONAL STATUS OUTCOME TOOL	MAIN FINDINGS	IMPLICATIONS AND LIMITATIONS
Shimo et al., (2020)	Pilot RCT	Japan/Workplace setting	N=39 Dropout=2 IG = 20 CG =17 Male =37	IG= 47.8 (12.8) CG= 41.4 (11.9)	Participants received workplace counselling program which incorporated MI techniques. 15-min face-to-face individual counselling session during working hours once a week for 12 weeks. MI delivered: physical therapist/occupational health nurses	Home-exercise programs including 7 floor stretches, 4 standing stretches, core stabilization and walking exercise.	Visual Analog Score/6-min walking distance, seated forward bends.	Baseline Pain Scores: IG = 38.1 (24.9) CG= 33.1 (31.6) Post-Intervention Pain Scores: IG = 29.2 (25.9) CG = 36 (26.0) Baseline Functional Status Scores: IG= 678.4 (85.1)-(6-minutes walk). 0.85 (11.4)cm (seated forward bend). CG = 622.8 (86.8)- (6 minute walk). -1.9 (12.4) (seated forward bend) Post-intervention functional	**Implications** Intervention reduced pain significantly and improved functional status in patients with chronic low back pain. **Limitations** Reliance on self-report measures for physical activity and low back pain can introduce bias, affecting the accuracy of the data.

								status scores: IG = 734.5 (67.8) (6-min walk). 5.4 (9.1) (seated forward bend) 686.6 (68.3). C= (6-min walk). -1.3 (10.9) (seated forward)(error from publication to contact authors.	
Friedrich et al., (1998; 2005)	A double-blind prospective RCT	Austria/Tertiary care setting	n=93, IG =44, CG =49	IG= 43.27 (10.37) CG= 44.88 (10.96)	The motivation program consisted of five compliance-enhancing interventions. Follow-up assessments were performed at 3 weeks, 4 months, and 12 months.	Patients were prescribed 10 physical therapy sessions and were advised to continue exercise.	101-point NPRS/Modified Waddell Score	Baseline pain scores: IG =50.2 (22.78) CG= 54.53(21.73) Post-intervention pain scores: IG =2.8 (1.3) CG =7.0 (2.5) Baseline functional status scores: IG = 3.3 (1.5) CG =3.2 (1.5) Post-intervention functional status scores: IG=35.9 (25.1) CG = 44.0(27.2)	**Implications** The combined exercise and motivation program proved to be more effective by the reduced disability and pain levels by the 12-month follow-up. **Limitations** Self-reported outcomes might be subject to bias and inaccuracies, especially when it comes to pain levels and disability.

Igwesi-Chidobe et al., (2019)	Non-randomised feasibility study	Nigeria/Rural primary care setting	N=22 IG= 13, CG = 9. Female = 16 Male =6 Dropouts = 2	IG= 53.9 (14.1) CG= 60.3 (13.6)	The programme combined group exercise sessions with group/ individual discussion sessions, informed by cognitive behavioural therapy and motivational interviewing.	Usual care	Igbo-11-Box Scale /not reported	Baseline pain scores: IG=6.8 (1.7) CG=5.3(1.6) Post-intervention pain scores: IG =2.8 (1.3) CG =7.0 (2.5)	**Implication** Study was feasible and acceptable. combined group and individual discussion sessions informed by CBT and motivational interviewing reduced pain intensity **Limitations** There is a potential for bias. This is due to the lack of randomization as factors other than the intervention might contribute to observed changes.

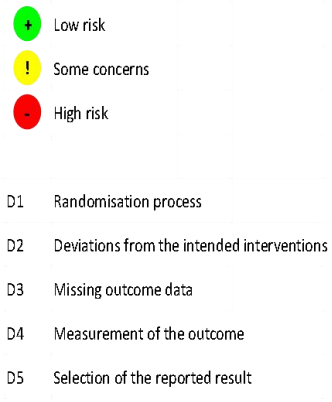
4.3 Quality Appraisal

As stated earlier, this review included three randomized controlled trial publications and one non-RCT. The RCTs were assessed using Cochrane risk of bias tool (ROB-2) while the non-RCT was assessed using the Down's and Black quality assessment tool. Table 4.2 presents the outcome from the assessment across the domains of random sequence generation, allocation concealment, blinding, completeness of outcome data and other possible danger to the internal validity of the included studies (Sterne et al., 2016).

Table 4.2 shows the quality assessment of three randomized controlled trials. In the overall, the three studies were shown to be of high quality (Shimo et al, 2020; Friedrich et al, 2005; Friedrich et al, 1998). All studies used valid and reliable outcome measures. They were classified as having high quality because there were low risks of bias in randomization process, identification or recruitment of participants, deviations from intended interventions, missing outcome data, measurement of the outcome and low risk of bias on selection of the reported result.

Table 4.2: Cochrane risk of bias table for the parallel randomized controlled trials (RCTs)

Unique ID	Study ID	Experimental	Comparator	Outcome	Weight	D1	D2	D3	D4	D5	Overall
1	Friedrich et al., 2005	experiment	control	Pain	1	+	+	+	+	+	+
2	Shimo et al., 2020	experiment	control	Pain	1	+	+	+	+	+	+
3	Friedrich et al., 1998	experiment	control	pain	1	+	+	+	+	+	+



One study (Igwesi-Chidobe et al, 2019) which is a non-randomized control trial was assessed using the Downs and Black quality assessment tool. The actual probability values were not reported for the main outcomes and sample sizes were not calculated. This led to an overall score of 22/32. It was shown to have a good methodological quality according to the Downs and Black scoring system. Table 4.3 presents the quality assessment of the study using the Downs and Black Checklist.

Authors	Downs & Black Checklist item*																										Total (0-28)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	UTD	UTD	Yes	UTD	Yes	Yes	Yes	Yes	No	No	Yes	Yes	1	22

Notes: 2, criterion fully met (item 5); 1, criterion met or partially met (item 5); 0, criterion not met

*Abbreviated Downs and Black checklist item description: 1, hypothesis/aims/objectives reported; 2, main outcome measures reported; 3, participant characteristics reported; 4, intervention details reported; 5, principal confounders reported; 6, main findings reported; 7, variability in main outcomes reported; 8, adverse events reported; 9, loss to follow-up reported; 10, probability values reported; 11, source population representative of entire population; 12, study population representative of source population; 13, study setting representative of usual care; 14, participants blinded to intervention; 15, outcome assessors blinded; 16, no retrospective sub-group analysis; 17, analysis adjusts for different lengths of follow-up of participants; 18, statistical tests are appropriate; 19, reliable compliance with intervention; 20, outcome measures are valid and reliable; 21, recruitment of study groups from same population; 22, recruitment of participants over same time period; 23, randomisation of participants; 24, allocation concealment; 25, adjustment for confounding variables in main analysis; 26, adjustment for loss to follow-up in main analysis; 27, inclusion of sample size calculation.

TABLE 4.3 Quality Assessment of a non-randomized controlled trials using Downs & Black

4.4 Synthesis of results

Findings from the synthesis of the results from studies included in this systematic review are presented here.

4.4.1 Summary of interventions

4.4.1.1 Effect of Motivational Interviewing on Low Back Pain

In this review, motivational interviewing could be seen to have a positive effect on LBP. Motivational interviewing which was carried out using face-to-face counselling sessions were found to improve physical activity which improved low back pain significantly from baseline to 6-month follow-up (Shimo *et al.,* 2020). A combined group and individual discussion sessions informed by CBT and motivational interviewing reduced low back pain intensity significantly (Igwesi-Chidobe *et al.,* 2019). Using a motivational program that incorporated motivational interviewing techniques came to the conclusion that although, low back pain intensity might improve with exercise, it is however not effective in the short-term. Low-back pain however improved in the intervention group at five-year follow-up (Friedrich et al, 1998). In conclusion, motivational interviewing has a positive effect on low back pain.

4.4.1.2 Effect of Motivational Interviewing on Functional Status

Motivational interviewing greatly improved functional status in two of the trials (Shimo et al,2020; Friedrich et al,1998; 2005).

4.4.1.3 Effect of motivational interviewing on Disability

Disability was assessed in three of the included publications. Observing pre-intervention and post-intervention scores, disability scores greatly reduced at 6 months follow up. Disability was also

reduced by the motivational interviewing incorporated the individual/group counselling sessions (Igwesi-Chidobe et al, 2019). The trial by Friedrich et al, (1998) also assessed disability. In contrast to the previous publications, disability was found to increase at all the treatment follow up.

4.4.1.4 Effect of Motivational Interview of Quality of Life

None of the studies assessed the effect of motivational interview on quality of life.

4.6 Key Findings

i. All of the included studies showed that the effectiveness of motivational interviewing on low back pain was statistically significant among patients with LBP.
ii. Motivational interviewing also has a positive effect on functional status.
iii. In all of the included studies, quality of life outcome was not assessed.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Low back pain is the leading cause of disability worldwide (WHO, 2020). It is a significant health issue which has a substantial impact on individuals' quality of life and is a common reason for seeking medical care (Harvitsgen, 2019). Approaches that consider behavioural change such as motivational interviewing have been proven to be effective in a variety of health conditions including LBP. This study aims to systematically review the effectiveness of motivational interview on low back pain. This review included two RCT studies (a pilot RCT and a double blind RCT) and 1 non-RCT feasibility study which evaluated the effectiveness of motivational interview on low back pain. The outcomes include pain, functional status and quality of life.

The evidence presented in this review demonstrated that MI was significantly effective in reducing pain intensity of people with low back pain. This is in synchrony with a previous review which showed that MI had significant improvements on pain intensity (Alperstein et al, 2016). This was due to the fact that adherence levels were higher in patients that were administered MI. However, the study failed to capture the long term effects of MI. Interestingly, the results of the included studies in this review showed that the effects of MI on pain were evident in both short-term and long-term, thus enacting the sustainability of MI.

Of the three included studies in this review, only two studies (Shimo et al., 2020; Friedrich et al.,1998; 2005) examined the effect of MI on functional status. The studies showed significant positive change from baseline to post-intervention. These findings are similar to a study by Thomas et al. (2012) which explored the effects of MI on functional status in cancer patients using the SF-36 outcome measure. Here, MI was found to have an improvement on functional status.

The study by Shimo et al. (2020) reported that MI via counselling produced a significant long-term effect on individuals (only male participants) with chronic low back pain. The study explored the effects of workplace counselling which helped to identify feasibility and potential trends. It also provided valuable insights into the effectiveness of counselling using MI strategies in improving outcomes such as pain and functional status in a practical context.

The study by Friedrich et al. (1998; 2005) utilised a motivational program which comprised compliance enhancement techniques such as extensive counseling, information strategies and reinforcement techniques. The study demonstrated that there was significant improvement on low back pain and functional status. It achieved this by enabling participants adopt healthier lifestyles, adhere to treatment plans, and develop the mental resilience needed to cope with chronic pain effectively. However, the motivational program was not designed to assess the quality of life.

From this review, one study explored the effects of individual/group discussion incorporating cognitive behavioural therapy and MI techniques on LBP (Igwesi-Chidobe et al., 2019). The effects included improvements in self-reported disability and low back pain. This is associated with increased adherence and motivation levels which was achieved through a collaborative patient-centred style. However, the study had no control group for comparison which made it challenging to determine whether any improvements observed were due to the intervention or other factors.

While interpreting the results, it is important to take some of this review's limitations into account. To begin with, the study only comprised three trials. One of the reasons is that we excluded other study designs like cohort studies, case control trials, and protocol studies by deciding to restrict the study to RCTs and non-RCTs. This was done in order to produce more trustworthy results. Secondly, there is limited generalizability to the results. This review aimed to assess the effect of

MI on all types of low back pain. However, all of the studies included in the review focused on chronic low back pain and only one evaluated recurrent LBP (Friedrich et al.1998, 2005). The overall results of this study may only apply to a specific population with chronic low back pain.

5.2 Conclusion

From the findings of this research, motivational interview interventions explored counselling, motivational programs and group/individual counselling. In conclusion, this study has highlighted that motivational interview was more effective in improving low back pain among patients with low back pain than other interventions (control). However, current evidence is insufficient on the effect of motivational interview on pain in patients with low back pain. More large scale RCTs are needed to evaluate motivational interview on pain in patients with low back pain.

5.3 Recommendation

There is paucity of knowledge on the effectiveness of motivational interview on quality of life. Therefore, it is recommended that there should be additions to the body of work on the effectiveness of motivational interview on the quality of life.

The importance of psychological/behavioral interventions is becoming increasingly clear. Clinicians must understand that these interventions do not exist solely for psychologists. Rather, they should adopt behavior-changing approaches like MI in everyday clinical practice. Also, they should undergo relevant training in the use of MI as competence has been proven to have a direct relationship with outcome.

5.4 Implication for Further Studies

Considering the limited evidence on the effect of MI on low back pain, future research should investigate the effectiveness of MI of low back pain in all its forms so as to enhance

generalizability. There is also a need for research to be carried out within the clinical setting so as to effectively monitor outcomes and the mechanisms behind them. Larger scale RCTs should also be conducted to broaden the knowledge on the effectiveness of MI on low back pain.

REFERENCES

Alkherayf, F., Agbi, C., Jeyanesan, S., & Kachur, E. (2018). Cigarette smoking and the intervertebral disc: a systematic literature review and meta-analysis of case-control studies. *Spine Journal*, 18(4), pp.613-624.

Alonso-García, M. and Sarría-Santamera, A., 2020. The economic and social burden of low back pain in Spain: a national assessment of the economic and social impact of low back pain in Spain. *Spine*, 45(16), pp.E1026-E1032.

American Academy of Orthopaedic Surgeons. (2019). Low back pain. Retrieved from on *https://orthoinfo.aaos.org/en/diseases--conditions/low-back-pain.* Accessed on April 12, 2023.

American College of Physicians. (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine*, 166(7), pp. 514-530.

Ammer, K., Ebenbichler, G., & Bochdansky, T. (2019). Low back pain—A disease or condition of impaired functional health? Definition-inherent consequences for the comprehensive care of back pain patients. *Healthcare*, 7(4), p.120.

Andersson, G. B. (1999). Epidemiological features of chronic low-back pain. *The Lancet,* 354(9178) , pp. 581-585.

Balagué, F., Mannion, A. F., Pellisé, F., et al. (2012). Non-specific low back pain. *The Lancet*, 379(9814), pp. 482-491.

Battié, M. C., Videman, T., Levalahti, E., Gill, K., & Kaprio, J. (2012). Heritability of low back pain and the role of disc degeneration. *Pain*, 153(7), pp.1525-1531.

Becker, M. H., Richards, K. C., & Brownson, C. A. (2018). Motivational interviewing with adherence: A randomized controlled trial. *Annals of Behavioral Medicine*, 52(8), pp.721-732.

Burke, B. L., Arkowitz, H., & Menchola, M. (2003). The efficacy of motivational interviewing: A meta-analysis of controlled clinical trials. *Journal of consulting and clinical psychology,* 71(5), pp.843-861.

Centers for Disease Control and Prevention (CDC). (2019). National Health Interview Survey. Retrieved from *https://www.cdc.gov/nchs/nhis/index.html*. Assessed on April 12, 2023

Channon, S., Smith, V., & Gregory, J. (2007). A pilot study of motivational interviewing in adolescents with diabetes. *Archives of Disease in Childhood,* 92(6), pp.507-509.

Chou, R., Qaseem, A., Snow, V., Casey, D., Cross Jr, J.T., Shekelle, P., Owens, D.K.,(2007). Diagnosis and treatment of low back pain: a joint clinical practice guideline from the American College of Physicians and the American Pain Society. *Annals of internal medicine*, *147*(7), pp.478-491.

Csillik, Antonia. (2013). Understanding Motivational Interviewing Effectiveness: Contributions From Rogers' Client-Centered Approach. *The Humanistic Psychologist*. 41(456). pp.350-363.

Foster, N. E., Anema, J. R., Cherkin, D., Chou, R., Cohen, S. P., Gross, D. P., Ferreira, M. L., Fritz, J. M., Koes, B. W., Peul, W., Turner, J. A., Maher, C. G., & Buchbinder, R. (2018).

Prevention and treatment of low back pain: evidence, challenges, and promising directions. *The Lancet*, 391(10137), pp.2368-2383.

Foster, N. E., Anema, J. R., Cherkin, D., Chou, R., Cohen, S. P., Gross, D. P., & Maher, C. G. (2018). Prevention and management of low back pain: a worldwide review of guidelines for the management of low back pain. *Spine Journal*, 18(6), pp.899-909.

Foster, N. E., Anema, J. R., Cherkin, D., Chou, R., Cohen, S. P., Gross, D. P., and Maher, C. G. (2018). Behavioural-graded activity compared with usual care for persistent low back pain: a randomised controlled trial. *The Lancet*, 391(10136), pp.109

Foster, N. E., Anema, J. R., Cherkin, D., Chou, R., Cohen, S. P., Gross, D. P., & Maher, C. G. (2018). Noninvasive treatments for low back pain. *JAMA*, 320(24), pp.2602-2603.

Foster, N. E., et al. (2018). Prevention and treatment of low back pain: evidence, challenges, and promising directions. *The Lancet,* 391(10137), pp.2368-2383.

Galozzi, P., Maghini, I., Bakdounes, L., Ferlito, E., Lazzari, V., Ermani, M., Chia, M., Gatti, D., Masiero, S. and Punzi, L., 2019. Prevalence of low back pain and its effect on health-related quality of life in 409 scholar adolescents from the Veneto region. *Reumatismo*, *71*(3), pp.132-140.

Gatchel, R. J., Neblett, R., & Kishino, N. D. (2018). Pain management and opioids: balancing safety and efficacy. Elsevier.

Hartvigsen, J., Hancock, M. J., Kongsted, A., Louw, Q., Ferreira, M. L., Genevay, S.and Underwood, M. (2018). What low back pain is and why we need to pay attention. *The Lancet*, 391(10137), pp.2356-2367

Hoy, D., Bain, C., Williams, G., et al. (2014). A systematic review of the global prevalence of low back pain. *Arthritis & Rheumatology*, 64(6), pp.2028-2037.

Hoy, D., Bain, C., Williams, G., et al. (2014). A systematic review of the global prevalence of low back pain. *Arthritis & Rheumatism,* 64(6), pp.2028-2037.

Jaffar, N. A. & Abdol Rahman, M. N. (2017). Review on risk factors related to lower back disorders at workplace. *IOP Conference Series: Materials Science and Engineering*, 23(67) pp.226.

Kaka, B., Idowu, O.A., Fawole, H.O., Adeniyi, A.F., Ogwumike, O.O. and Toryila, M.T., 2016. An analysis of work-related musculoskeletal disorders among butchers in Kano Metropolis, Nigeria. *Safety and health at work*, *7*(3), pp.218-224.

Louw, Q. A., Morris, L. D., & Grimmer-Somers, K. (2007). The prevalence of low back pain in Africa: A systematic review. *BMC Musculoskeletal Disorders*, 8(1), p.105.

Miller, W.R., & Rollnick, S. (2013). Motivational interviewing: helping people change. Guilford Press.

Qaseem, A., Wilt, T. J., McLean, R. M., & Forciea, M. A. (2017). Noninvasive treatments for acute, subacute, and chronic low back pain: a clinical practice guideline from the American College of Physicians. *Annals of Internal Medicine*, 166(7), pp.514-530.

Rollnick, S., Miller, W. R., & Butler, C. C. (2008). Motivational interviewing in health care: helping patients change behavior. CRC Press.

Rubak, S., Sandbæk, A., Lauritzen, T., & Christensen, B. (2005). Motivational interviewing: A systematic review and meta-analysis. *British Journal of General Practice,* 55(513), pp.305-312.

Smith, J., Brown, L., & Johnson, M. (2022). Motivational Enhancement Therapy in Addition to Physical Therapy Improves Motivational Factors and Treatment Outcomes in People With Low Back Pain: A Randomized Controlled Trial. *Journal of Pain Management,* 10(1), pp.25-35.

Vos, T., Abajobir, A. A., Abate, K. H., Abbafati, C., Abbas, K. M., Abd-Allah, F. and Abdulle, A. M. (2016). Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *The Lancet*, 390(10100), pp.1211-1259.

Vos, T., Allen, C., Arora, M., Barber, R. M., Bhutta, Z. A., Brown, A. and Murray, C. J. (2016). Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet,* 388(10053), pp.1545-1602.

Wu A, March L, Zheng X, Huang J, Wang X, Zhao J, Blyth FM, Smith E, Buchbinder R, Hoy D. Global low back pain prevalence and years lived with disability from 1990 to 2017:estimates from the Global Burden of Disease Study 2017. *Ann Trans Med 2020*; 8(6): pp.299-313.

APPENDICES

APPENDIX I: SEARCH STRATEGY

Search strategy for electronic database (21st July 2023)

Medline via Ovid		
1	person-centered psychotherapy/ or motivational interviewing/ or directive counseling/ or motivation/ or goals/ or intention/ or achievement/ or empowerment/	130763
2	(((motivat* or empower*) adj3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or nondirective therap* or non-directive therap* or rogerian therap* or counsel* or goal-oriented or goal-directed or coach* or ((person-cent?red or client-cent?red) adj2 (psychotherap* or psycho-therap* or therap*)) or (reflective* adj2 listen*) or (decision* adj2 balanc*) or (open adj2 question*) or (open-ended adj2 question*) or (convers* adj2 change*)).ti,ab,kf.	214429
3	or/1-2	330673
4	exp back pain/ or exp sciatic neuropathy/ or exp spondylitis/ or exp back injuries/ or exp spinal diseases/ or ((exp back/ or exp spine/) and (pain/ or acute pain/ or arthralgia/ or chronic pain/ or musculoskeletal pain/ or myalgia/ or neuralgia/ or nociceptive pain/ or visceral pain/ or pain, intractable/ or pain, referred/ or exp arthritis/ or spasm/))	207567
5	((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or	78798

	intervertebral* or spine or spinal* or discogen*) adj3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthros#s or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*)).ti,ab,kf.	
6	((disc or disk or discs or disks) adj2 (protrud* or protusion* or hernia* or slip* or prolaps* or displac* or degenerat* or degrad*)).ti,ab,kf.	28539
7	(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or spondylolis* or spondyl?arthr* or sacroiliiti* or failed back or failed fusion or postlaminectom* or post-laminectom* or fbss or (back* adj2 (injur* or disorder*))).ti,ab,kf.	63784
8	or/4-7	271791
9	exp "clinical trials as topic"/ or randomized controlled trial/ or random allocation/ or double blind method/ or single blind method/ or clinical trial/ or placebos/	1327744
10	(clinical trial phase I or clinical trial phase ii or clinical trial phase iii or clinical trial phase iv or controlled clinical trial or randomized controlled trial or multicenter study or clinical trial).pt.	1173525
11	(randomiz* or randomis* or randomly or trial* or placebo*).tw.	1916307
12	((singl* or doubl* or trebl* or tripl*) adj (blind* or mask*)).tw.	198280
13	(random* adj2 allocat*).tw.	43964
14	or/9-13	2635827
15	(letter or editorial or comment or news or newspaper article).pt.	2396046
16	*14 not 15*	2546858

17	3 and 8 and 16	476
18	limit 17 to english language	453

Cochrane Central Register of Controlled Trials		
1	person-centered psychotherapy/ or motivational interviewing/ or directive counseling/ or motivation/ or goals/ or intention/ or achievement/ or empowerment/	11072
2	(((motivat* or empower*) adj3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or nondirective therap* or non-directive therap* or rogerian therap* or counsel* or goal-oriented or goal-directed or coach* or ((person-cent?red or client-cent?red) adj2 (psychotherap* or psycho-therap* or therap*)) or (reflective* adj2 listen*) or (decision* adj2 balanc*) or (open adj2 question*) or (open-ended adj2 question*) or (convers* adj2 change*)).ti,ab,kf.	42041
3	or/1-2	49637
4	exp back pain/ or exp sciatic neuropathy/ or exp spondylitis/ or exp back injuries/ or exp spinal diseases/ or ((exp back/ or exp spine/) and (pain/ or acute pain/ or arthralgia/ or chronic pain/ or musculoskeletal pain/ or myalgia/ or neuralgia/ or nociceptive pain/ or visceral pain/ or pain, intractable/ or pain, referred/ or exp arthritis/ or spasm/))	13812
5	((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or	18859

	sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or intervertebral* or spine or spinal* or discogen*) adj3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthros#s or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*)).ti,ab,kf.	
6	((disc or disk or discs or disks) adj2 (protrud* or protusion* or hernia* or slip* or prolaps* or displac* or degenerat* or degrad*)).ti,ab,kf.	3472
7	(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or spondylolis* or spondyl?arthr* or sacroiliiti* or failed back or failed fusion or postlaminectom* or post-laminectom* or fbss or (back* adj2 (injur* or disorder*))).ti,ab,kf.	7959
8	or/4-7	30663
9	3 and 8	485
10	limit 9 to english language	472

PsycInfo		
1	client centered therapy/ or motivational interviewing/ or motivation/ or goals/ or intention/ or achievement/	110755
2	(((motivat* or empower*) adj3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or nondirective therap* or non-directive therap* or rogerian therap* or counsel* or goal-oriented or goal-directed or coach* or ((person-cent?red or client-cent?red) adj2 (psychotherap* or psycho-therap* or therap*)) or (reflective* adj2 listen*) or (decision* adj2 balanc*) or (open adj2 question*) or (open-ended adj2 question*) or (convers* adj2 change*)).ti,ab,hw.	202460
3	or/1-2	297599
4	back pain/ or (("back (anatomy)"/ or spinal column/) and (pain/ or acute pain/ or chronic pain/ or neuropathic pain/ or neuralgia/ or myofascial pain/ or exp arthritis/ or muscle spasms/))	4785
5	((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or intervertebral* or spine or spinal* or discogen*) adj3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthros#s or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*)).ti,ab,hw.	8535
6	((disc or disk or discs or disks) adj2 (protrud* or protusion* or hernia* or	370

	slip* or prolaps* or displac* or degenerat* or degrad*)).ti,ab,hw.	
7	(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or spondylolis* or spondyl?arthr* or sacroiliiti* or failed back or failed fusion or postlaminectom* or post-laminectom* or fbss or (back* adj2 (injur* or disorder*))).ti,ab,hw.	3517
8	or/4-7	11837
9	exp clinical trials/ or placebo/	19162
10	0300.md.	37909
11	(randomiz* or randomis* or randomly or trial* or placebo*).tw.	329085
12	((singl* or doubl* or trebl* or tripl*) adj (blind* or mask*)).tw.	29040
13	(random* adj2 allocat*).tw.	5081
14	or/9-13	339993
15	dissertation abstract.pt.	554850
16	14 not 15	318236
17	3 and 8 and 16	64
18	limit 17 to english language	63

CINAHL	
(MH "motivational interviewing") or (MH motivation) or (MH "goals and objectives+") or (MH intention) or (MH achievement)	103794
(((motivat* or empower*) N3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or (nondirective N1 therap*) or ("non-directive" N1 therap*) or (rogerian N1 therap*) or counsel* or "goal-oriented" or "goal-directed" or coach* or ((person-cent#red or client-cent#red) N2 (psychotherap* or therap*)) or (reflective* N2 listen*) or (decision* N2 balanc*) or (open N2 question*) or (open-ended N2 question*) or (convers* N2 change*))	139941
S1 or S2	231438
(MH "back pain+") or (MH sciatica) or (MH "spinal diseases+") or (MH "back injuries") or (((MH back) or (MH spine+)) and ((MH pain) or (MH arthralgia) or (MH "chronic pain") or (MH "musculoskeletal pain") or (MH "muscle pain") or (MH neuralgia) or (MH "nociceptive pain+") or (MH "referred pain") or (MH arthritis+) or (MH spasm)))	74265
((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or intervertebral* or spine or spinal* or discogen*) N3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthros?s or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*))	50734
((disc or disk or discs or disks) N2 (protrud* or protusion* or hernia* or slip* or	9784

prolaps* or displac* or degenerat* or degrad*))	
(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or spondylolis* or spondyl#arthr* or sacroiliiti* or "failed back" or "failed fusion" or postlaminectom* or (post N1 laminectom*) or fbss or (back* N2 (injur* or disorder*)))	27430
S4 or S5 or S6 or S7	101147
(MH "clinical trials+") or (MH "random assignment") or (MH placebos)	374058
(ZT "randomized controlled trial")	150929
(randomiz* or randomis* or randomly or trial* or placebo*)	686325
((singl* or doubl* or trebl* or tripl*) N1 (blind* or mask*))	88062
(random* N2 allocat*)	14568
S9 or S10 or S11 or S12 or S13	713151
(ZT "book review") or (ZT "commentary") or (ZT "consumer/patient teaching materials") or (ZT "dissertation") or (ZT "doctoral dissertation") or (ZT "editorial") or (ZT "letter") or (ZT "letter to the editor") or (ZT "newspaper") or (ZT "poetry") or (ZT "product review")	996000
S14 or S15	1662265
S3 and S8 and S16	382
S17	375

Web of Science Core Collection	
TS=(((motivat* or empower*) NEAR/3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or (nondirective NEAR/3 therap*) or ("non-directive" NEAR/1 therap*) or (rogerian NEAR/1 therap*) or counsel* or "goal-oriented" or "goal-directed" or coach* or ((person-centred or client-centred or person-centered or client-centered) NEAR/2 (psychotherap* or therap*)) or (reflective* NEAR/2 listen*) or (decision* NEAR/2 balanc*) or (open NEAR/2 question*) or (open-ended NEAR/2 question*) or (convers* NEAR/2 change*))	341952
TS=((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or intervertebral* or spine or spinal* or discogen*) NEAR/3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthroses or arthrosis or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*))	107833
TS=((disc or disk or discs or disks) NEAR/2 (protrud* or protusion* or hernia* or slip* or prolaps* or displac* or degenerat* or degrad*))	29449
TS=(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or	86075

spondylolis* or spondylarthr* or spondyloarthr* or sacroiliiti* or "failed back" or "failed fusion" or postlaminectom* or (post NEAR/1 laminectom*) or fbss or (back* NEAR/2 (injur* or disorder*)))	
#2 or #3 or #4	197840
TS=(randomiz* or randomis* or randomly or trial* or placebo*)	2767278
TS=((singl* or doubl* or trebl* or tripl*) NEAR/1 (blind* or mask*))	365191
TS=(random* NEAR/2 allocat*)	45371
#6 or #7 or #8	2848581
#1 and #5 and #9	575
#1 and #5 and #9 and English (Languages)	565

Scopus	
TITLE-ABS-KEY(((motivat* or empower*) W/3 (interview* or enhance* or change* or interven* or elicit* or therap* or instruct* or advice or guidance or recommend*)) or (nondirective W/3 therap*) or ("non-directive" W/1 therap*) or (rogerian W/1 therap*) or counsel* or "goal-oriented" or "goal-directed" or coach* or ((person-centred or client-centred or person-centered or client-centered) W/2 (psychotherap* or therap*)) or (reflective* W/2 listen*) or (decision* W/2 balanc*) or (open W/2 question*) or (open-ended W/2 question*) or (convers* W/2 change*))	495440

TITLE-ABS-KEY((back or lumbar* or lumbal or lumbosacr* or sacral* or sacroiliac* or sacrococcygeal* or coccygeal* or sciatic or vertebral* or vertebrogen* or intervertebral* or spine or spinal* or discogen*) W/3 (pain* or ache* or aching or arthralgi* or myalgi* or sore* or neuralgi* or neuropath* or neurodyni* or arthriti* or arthros#s or osteoarthr* or polyarthriti* or oligoarthriti* or spasm* or strain*))	139335
TITLE-ABS-KEY((disc or disk or discs or disks) W/2 (protrud* or protusion* or hernia* or slip* or prolaps* or displac* or degenerat* or degrad*))	55224
TITLE-ABS-KEY(lumbago or lumbalgi* or lumbalgesi* or lumbodyni* or backpain* or backach* or sciatica* or sciatalgi* or dorsalgi* or coccydyni* or spondyliti* or spondylos* or spondylolis* or spondylarthr* or spondyloarthr* or sacroiliiti* or "failed back" or "failed fusion" or postlaminectom* or (post W/1 laminectom*) or fbss or (back* W/2 (injur* or disorder*)))	172898
#2 or #3 or #4	299821
TITLE-ABS-KEY(randomiz* or randomis* or randomly or trial* or placebo*)	3734401
TITLE-ABS-KEY((singl* or doubl* or trebl* or tripl*) W/1 (blind* or mask*))	331108
TITLE-ABS-KEY(random* W/2 allocat*)	144317
#6 or #7 or #8	3778895
#1 AND #5 AND #9	817
(TITLE-ABS-KEY (((motivat* OR empower*) W/3 (interview* OR enhance* OR change* OR interven* OR elicit* OR therap* OR instruct* OR advice OR guidance OR	795

recommend*)) OR (nondirective W/3 therap*) OR ("non-directive" W/1 therap*) OR (rogerian W/1 therap*) OR counsel* OR "goal-oriented" OR "goal-directed" OR coach* OR ((person-centred OR client-centred OR person-centered OR client-centered) W/2 (psychotherap* OR therap*)) OR (reflective* W/2 listen*) OR (decision* W/2 balanc*) OR (open W/2 question*) OR (open-ended W/2 question*) OR (convers* W/2 change*))) AND ((TITLE-ABS-KEY ((back OR lumbar* OR lumbal OR lumbosacr* OR sacral* OR sacroiliac* OR sacrococcygeal* OR coccygeal* OR sciatic OR vertebral* OR vertebrogen* OR intervertebral* OR spine OR spinal* OR discogen*) W/3 (pain* OR ache* OR aching OR arthralgi* OR myalgi* OR sore* OR neuralgi* OR neuropath* OR neurodyni* OR arthriti* OR arthros#s OR osteoarthr* OR polyarthriti* OR oligoarthriti* OR spasm* OR strain*))) OR (TITLE-ABS-KEY ((disc OR disk OR discs OR disks) W/2 (protrud* OR protusion* OR hernia* OR slip* OR prolaps* OR displac* OR degenerat* OR degrad*))) OR (TITLE-ABS-KEY (lumbago OR lumbalgi* OR lumbalgesi* OR lumbodyni* OR backpain* OR backach* OR sciatica* OR sciatalgi* OR dorsalgi* OR coccydyni* OR spondyliti* OR spondylos* OR spondylolis* OR spondylarthr* OR spondyloarthr* OR sacroiliiti* OR "failed back" OR "failed fusion" OR postlaminectom* OR (post W/1 laminectom*) OR fbss OR (back* W/2 (injur* OR disorder*))))) AND ((TITLE-ABS-KEY (randomiz* OR randomis* OR randomly OR trial* OR placebo*)) OR (TITLE-ABS-KEY ((singl* OR doubl* OR trebl* OR tripl*) W/1 (blind* OR mask*))) OR (TITLE-ABS-KEY (random* W/2 allocat*))) AND (LIMIT-TO (LANGUAGE , "English"))	

PEDRO	
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: motivation*	29
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: empower*	5
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: nondirective	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "non-directive"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: rogerian	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: counsel*	30
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "goal oriented"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "goal directed"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: coach*	18
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical	1

trial; Abstract & Title: "person centered"	
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "person centred"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "client centered"	1
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "client centred"	1
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "reflective listening"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "open question"	1
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "open questioning"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "open-ended question"	0
Problem: pain; Body Part: lumbar spine, sacro-iliac joint or pelvis; Method: clinical trial; Abstract & Title: "open-ended questioning"	0
Total	79

APPENDIX II: Modified Quality Index Assessment Criteria For Methodology of Studies

Table 1. *Modified Quality Index assessment criteria for methodology of studies*

Criterion	Weighted Score (points)
Reporting	**11**
• Is the hypothesis/aim/objective of the study clearly described?	1
• Are the main outcomes described in the Introduction or Methods?	1
• Are the characteristics of the patients clearly described?	1
• Are the interventions of interest clearly described?	1
• Are the distributions of principal confounders clearly described?	2
• Are the main findings of the study clearly described?	1
• Does the study provide estimates of random variability for outcomes?	1
• Have all important adverse events been reported?	1
• Have the characteristics of patients lost to follow-up been described?	1
• Have actual probability values been reported for main outcomes?	1
External Validity	**3**
• Were subjects who were asked to participate representative of the entire population?	1
• Were those subjects who were prepared to participate representative of the entire population?	1
• Were the staff and facilities where the patients were treated representative of the treatment the majority of patients receive?	1
Internal Validity - Bias	**7**
• Was an attempt made to blind study subjects to the intervention they have received?	1
• Was an attempt made to blind those measuring the main outcomes?	1
• If the results were based on "data dredging," was this made clear?	1
• Is the time period between interventions and outcomes the same for cases and controls?	1
• Were statistical tests used to assess the main outcomes appropriate?	1
• Was compliance with the intervention/s reliable?	1
• Were the main outcome measures used accurate (valid/reliable)?	1
Internal Validity – Confounding (selection bias)	**6**
• Were the groups, cases, and controls recruited from the same population?	1
• Were study subjects in different groups recruited over the same period of time?	1
• Were study subjects randomized to intervention groups?	1
• Was the randomized assignment concealed from both patients and health care staff until recruitment was complete?	1
• Was there adequate adjustment for confounding?	1
• Were losses of patients to follow-up taken into account?	1
Power	**5**
• Did the study have sufficient power to detect a clinically important event where the probability due to chance is less than 5%?	5
TOTAL SCORE	**32**

Adapted and modified from Downs et al. The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health* 1998;52:377-84 (22).

APPENDIX III: Downs and Black checklist for non-randomized studies

ALL CRITERIA	DESCRIPTION OF CRITERIA (with additional explanation as required, determined by consensus of raters)	ANSWERS
1	Is the hypothesis/aim/objective of the study clearly described? Must be explicit	Yes
2	Are the main outcomes to be measured clearly described in the Introduction or Methods section? If the main outcomes are first mentioned in the Results section, the question should be answered no. ALL primary outcomes should be described for YES	Yes
3	Are the characteristics of the patients included in the study clearly described? In cohort studies and trials, inclusion and/or exclusion criteria should be given. In case-control studies, a case-definition and the source for controls should be given. Single case studies must state source of patient	Yes
4	Are the interventions of interest clearly described? Treatments and placebo (where relevant) that are to be compared should be clearly described.	Yes
5	Are the distributions of principal confounders in each group of subjects to be compared clearly described? A list of principal confounders is provided. YES = age, severity	Yes
6	Are the main findings of the study clearly described? Simple outcome data (including denominators and numerators) should be reported for all major findings so that the reader can check the major analyses and conclusions.	Yes
7	Does the study provide estimates of the random variability in the data for the main outcomes? In non normally distributed data the inter-quartile range of results should be reported. In normally distributed data the standard error, standard deviation or confidence intervals should be reported	Yes

8	Have all important adverse events that may be a consequence of the intervention been reported? This should be answered yes if the study demonstrates that there was a comprehensive attempt to measure adverse events (COMPLICATIONS BUT NOT AN INCREASE IN PAIN).	Yes
9	Have the characteristics of patients lost to follow-up been described? If not explicit = NO. RETROSPECTIVE – if not described = UTD; if not explicit re: numbers agreeing to participate = NO. Needs to be >85%	Yes
10	Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	No
11	Were the subjects asked to participate in the study representative of the entire population from which they were recruited? The study must identify the source population for patients and describe how the patients were selected.	Yes
12	Were those subjects who were prepared to participate representative of the entire population from which they were recruited? The proportion of those asked who agreed should be stated.	Yes
13	Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive? For the question to be answered yes the study should demonstrate that the intervention was representative of that in use in the source population. Must state type of hospital and country for YES.	Yes
14	Was an attempt made to blind study subjects to the intervention they have received? For studies where the patients would have no way of knowing which intervention they received, this should be answered yes. Retrospective, single group = NO; UTD if > 1 group and blinding not explicitly stated	No

15	Was an attempt made to blind those measuring the main outcomes of the intervention? Must be explicit	UTD
16	If any of the results of the study were based on “data dredging”, was this made clear? Any analyses that had not been planned at the outset of the study should be clearly indicated. Retrospective = NO. Prospective = YES	UTD
17	In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls? Where follow-up was the same for all study patients the answer should yes. Studies where differences in follow-up are ignored should be answered no. Acceptable range 1 yr follow up = 1 month each way; 2 years follow up = 2 months; 3 years follow up = 3months.....10years follow up = 10 months	Yes
18	Were the statistical tests used to assess the main outcomes appropriate? The statistical techniques used must be appropriate to the data. If no tests done, but would have been appropriate to do = NO	UTD
19	Was compliance with the intervention/s reliable? Where there was non compliance with the allocated treatment or where there was contamination of one group, the question should be answered no. Surgical studies will be YES unless procedure not completed.	Yes

20	Were the main outcome measures used accurate (valid and reliable)? Where outcome measures are clearly	Yes

	described, which refer to other work or that demonstrates the outcome measures are accurate = YES. ALL primary outcomes valid and reliable for YES	
21	Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population? Patients for all comparison groups should be selected from the same hospital. The question should be answered UTD for cohort and case control studies where there is no information concerning the source of patients	Yes
22	Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same time? For a study which does not specify the time period over which patients were recruited, the question should be answered as UTD. Surgical studies must be <10 years for YES, if >10 years then NO	Yes
23	Were study subjects randomised to intervention groups? Studies which state that subjects were randomised should be answered yes except where method of randomisation would not ensure random allocation.	No
24	Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable? All non-randomised studies should be answered no. If assignment was concealed from patients but not from staff, it should be answered no.	No
25	Was there adequate adjustment for confounding in the analyses from which the main findings were drawn? In nonrandomised studies if the effect of the main confounders was not investigated or no adjustment was made in the final analyses the question should be answered as no. If no significant difference between groups shown then YES	Yes

26	Were losses of patients to follow-up taken into account? If the numbers of patients lost to follow-up are not reported = unable to determine.	Yes
27	Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance <5% Sample sizes have been calculated to detect a difference of x% and y%.	1-5

APPENDIX IV

Quality Assessment of a non-randomized controlled trials (non-RCTs) using the Downs & Black Checklist.

Author, year and country	Reporting (/11)	External Validity (/3)	Internal Validity – Bias (/7)	Internal Validity Confounding (/6)	Sufficient power to detect a clinically important effect (/5)	Overall score (/32)	Overall Quality
Igwesi-Chidobe et al, 2019.	10	3	4	4	1	22	Good

APPENDIX V

PRISMA 2020 CHECKLIST

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	Page i
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page iv
INTRODUCTION			Page 1-7
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Page 5
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 5
METHODS			Page 20-24
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 20
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 21
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Page 21
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 22
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if	Page 22

Section and Topic	Item #	Checklist item	Location where item is reported
		applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 22
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 22
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 23
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Page 23
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Page 24
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Page 24
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Page 24
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Page 24
	13e	Describe any methods used to explore possible causes of heterogeneity among	Page 24

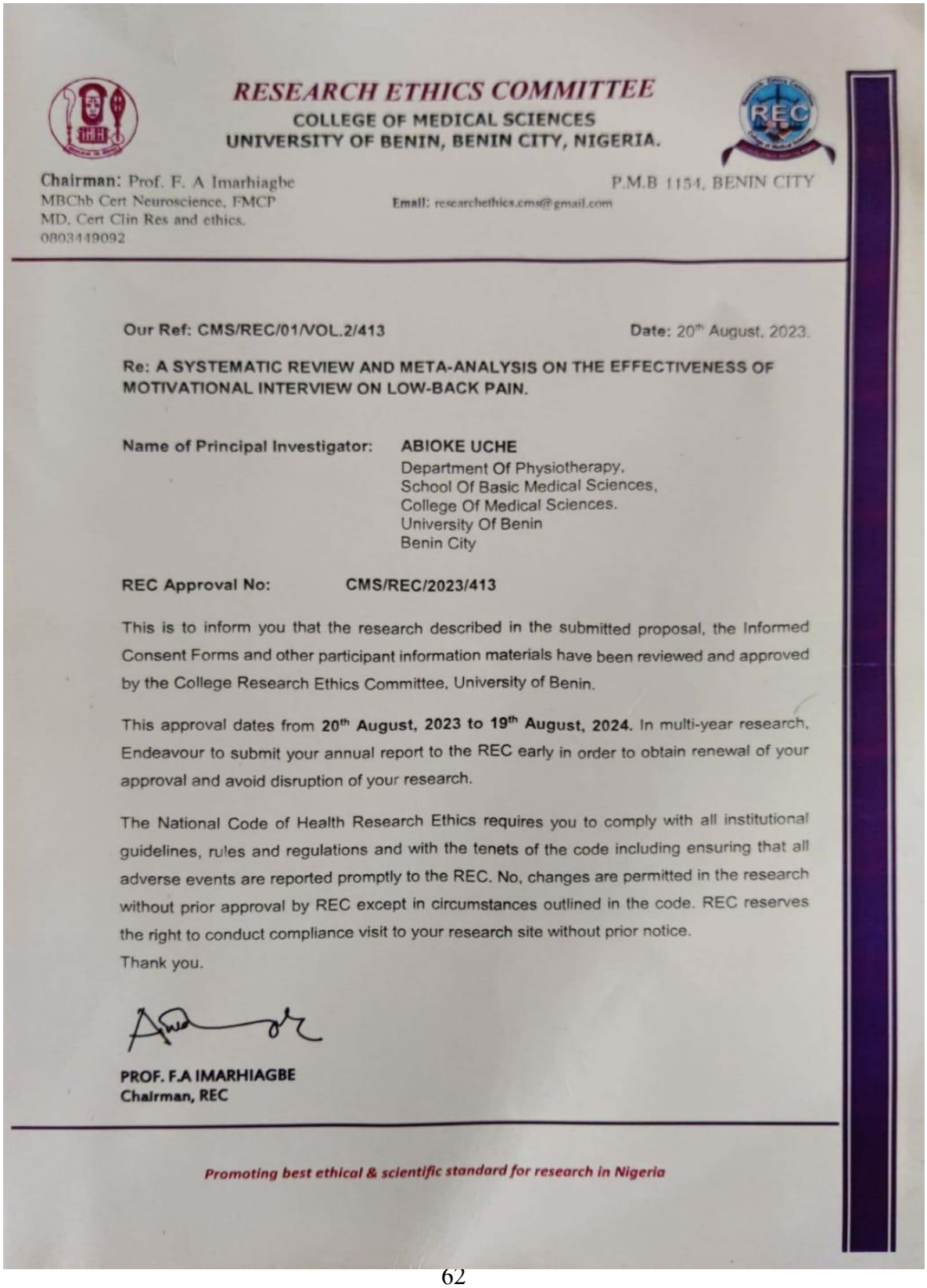
Section and Topic	Item #	Checklist item	Location where item is reported
		study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	NA
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	NA
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	NA
RESULTS			Page 25-39
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 25
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Page 25
Study characteristics	17	Cite each included study and present its characteristics.	Page 27
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Page 32
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Page 34
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 38
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe	NA

Section and Topic	Item #	Checklist item	Location where item is reported
		the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	NA
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	NA
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	NA
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	NA
DISCUSSION			Page 41- 42
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 41
	23b	Discuss any limitations of the evidence included in the review.	Page 42
	23c	Discuss any limitations of the review processes used.	Page 42
	23d	Discuss implications of the results for practice, policy, and future research.	Page 42
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Page iv
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Page iv
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	NA
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	NA
Competing interests	26	Declare any competing interests of review authors.	NA

Section and Topic	Item #	Checklist item	Location where item is reported
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	NA

APPENDIX VI

ETHICAL APPROVAL LETTER



RESEARCH ETHICS COMMITTEE
COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

Chairman: Prof. F. A Imarhiagbe
MBChb Cert Neuroscience, FMCP
MD, Cert Clin Res and ethics.
0803449092

P.M.B 1154, BENIN CITY
Email: researchethics.cms@gmail.com

Our Ref: CMS/REC/01/VOL.2/413 **Date:** 20th August, 2023.

Re: A SYSTEMATIC REVIEW AND META-ANALYSIS ON THE EFFECTIVENESS OF MOTIVATIONAL INTERVIEW ON LOW-BACK PAIN.

Name of Principal Investigator: **ABIOKE UCHE**
Department Of Physiotherapy,
School Of Basic Medical Sciences,
College Of Medical Sciences.
University Of Benin
Benin City

REC Approval No: **CMS/REC/2023/413**

This is to inform you that the research described in the submitted proposal, the Informed Consent Forms and other participant information materials have been reviewed and approved by the College Research Ethics Committee, University of Benin.

This approval dates from **20th August, 2023 to 19th August, 2024.** In multi-year research, Endeavour to submit your annual report to the REC early in order to obtain renewal of your approval and avoid disruption of your research.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the REC. No, changes are permitted in the research without prior approval by REC except in circumstances outlined in the code. REC reserves the right to conduct compliance visit to your research site without prior notice.
Thank you.

PROF. F.A IMARHIAGBE
Chairman, REC

Promoting best ethical & scientific standard for research in Nigeria