**Supplementary File A: Audit Trail.**

**STEP 1: The primary systematic search**

**Figure 1.** A table outlining the databases and search terms for the first systematic search.

|  |  |
| --- | --- |
| **Database** | **Search Terms** |
| MEDLINE | ‘Hope’ OR ‘Hopelessness’ OR ‘Hope scale’ NOT ‘optimism’  AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ AND ‘pain management’ OR ‘pain reduction’ OR ‘quality of life’ |
| CINAHL | ‘Hope’ OR ‘Hopelessness’ OR ‘Hope scale’ NOT ‘optimism’  AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ AND ‘pain management’ OR ‘pain reduction’ OR ‘quality of life’ |
| PubMed | (Chronic low back pain OR non-specific low back pain OR persistent low back pain) AND (Hope’ OR ‘Hopelessness’ OR ‘Hope scale’ NOT ‘optimism’) AND (‘pain management’ OR ‘pain reduction’ OR ‘quality of life’) |
| AMED | ‘Hope’ OR ‘Hopelessness’ OR ‘Hope scale’ NOT ‘optimism’  AND ‘Chronic low back pain OR non-specific low back pain OR persistent low back pain’. |
| PEDro | ‘Chronic pain’ ‘hope’  ‘Chronic low back pain’ ‘hope’  ‘Persistent low back pain’ ‘hope’  Low back \* ‘hope’  NB: It automatically uses ‘and’ between words. Also use the askaris (e.g. hope\* - will cover hopelessness etc.) |
| SPORTDiscus | ‘Hope’ OR ‘Hopelessness’ OR ‘Hope scale’ NOT ‘optimism’  AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ AND ‘pain management’ OR ‘pain reduction’ OR ‘quality of life’ |
| Google Scholar | allintitle: hope "chronic pain". |
| ScienceDirect | (hope OR hopelessness OR hope scale NOT optimism) AND (chronic low back pain OR persistent low back pain OR non-specific low back pain) in title and abstract. |
| Hope-Lit database.  The University of Alberta. | Searched through all articles in the ‘Chronic Pain’ section. |

**Limitations:**

* Search mode: Boolean/Phrase
* Publication date: 2003-2024
* Language: English
* Search field: Abstract.

**Inclusion criteria:**

* Population: adults (18-70yrs) with chronic low back pain (>3months)
* The use of an outcome measure of hope, or discussed the concept of hope from the perspective of the individual with CLBP in the results section of the abstract.

**STEP 1 (continued): Search Process**

**Figure 2. NHS Knowledge and library hub search strategy screenshot.**

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Selected search ‘S5’, then limited the database to: MEDLINE and then CINAHL.

**Figure 3. A table outlining the search results for MEDLINE and CINAHL.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| MEDLINE | 18 | 1 | Toye, F. & Barker, K. (2012). I can’t see any reason for stopping doing anything, but I might have to do it differently’ – restoring hope to patients with persistent non-specific low back pain – a qualitative study. Disability & Rehabilitation, 34 (11), pp. 894-903. |
| CINAHL | 13 | 1 | Toye, F. & Barker, K. (2012). I can’t see any reason for stopping doing anything, but I might have to do it differently’ – restoring hope to patients with persistent non-specific low back pain – a qualitative study. Disability & Rehabilitation, 34 (11), pp. 894-903. |

**STEP 1 (continued): Search Process**

**Figure 4. A screenshot of the AMED (available through OVID platform) search strategy:**

**A screenshot of a computer

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**Figure 5. A table outlining the search results for AMED:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| AMED | 0 | 0 |  |

**STEP 1 (continued): Search Process**

**Figure 6. Screenshots (x4) of the PEDro search strategies.**

A screenshot of a search box

Description automatically generatedA screenshot of a computer

Description automatically generatedSearch 1: A screenshot of a computer

Description automatically generatedSearch 3:

A screenshot of a search box

Description automatically generated**A screenshot of a computer

Description automatically generated**  
Search 2: Search 4:

**Figure 7. A table outlining the search results for PEDro**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| PEDro (Search 1) | 19 | 0 |  |
| PEDro (Search 2) | 6 | 0 |  |
| PEDro (Search 3) | 1 | 0 |  |
| PEDro (Search 4) | 17 | 0 |  |

**STEP 1 (continued): Search Process**

**Figure 8. A screenshot of the PudMed search strategy.**

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**Figure 9. A table outlining the search results for PubMed**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| PubMed | 24 | 2 | Toye, F. and Barker, K. (2012). I can’t see any reason for stopping doing anything, but I might have to do it differently’ – restoring hope to patients with persistent non-specific low back pain – a qualitative study. Disability & Rehabilitation, 34 (11), pp. 894-903.  Corbett, M., Foster, N. and Ong, B. (2007) 'Living with low back pain - Stories of hope and despair', *Social science and Medicine*, 65 (8) pp. 1584-1594. doi:10.1016/j.socscimed.2007.06.008 |

**STEP 1 (continued): Search Process**

**Figure 10. A screenshot of the SPORTDiscus search strategy.**

**A screenshot of a computer

Description automatically generated**

**Figure 11. A table outlining the search results for SPORTDiscus.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| SPORTDiscus | 6 | 1 | Toye, F. and Barker, K. (2012). I can’t see any reason for stopping doing anything, but I might have to do it differently’ – restoring hope to patients with persistent non-specific low back pain – a qualitative study. Disability & Rehabilitation, 34 (11), pp. 894-903. |

**STEP 1 (continued): Search Process**

**Figure 12.** **A screenshot of the first Google Scholar search strategy** (NB: Unable to limit language)

**A screenshot of a computer

Description automatically generated**

**Figure 13. A table outlining the results for Google Scholar (search 1).**

|  |  |  |  |
| --- | --- | --- | --- |
| **Electronic Database** | No. of articles | Met eligibility criteria | Articles: |
| GoogleScholar Search 1 | 6 | 3 | **Accepted:**   * Wojtyna, E., Palt, L. and Popiolek, K. (2015) ‘From Polyanna syndrome to Eeyore’s Corner? Hope and pain in patients with chronic low back pain’, *Polish Psychological Bulletin, 46 (1) pp. 96-103.* doi:10.1515/ppb-2015-0013.   + - * Abdolghaderi, M. Kafi, S., Saberi, A. and Ariaporan, S. (2018) ‘ Effectiveness of Mindfulness-Based Cognitive Therapy on Hope and Pain Beliefs of Patients with Chronic Low Back Pain’, *Caspian Journal of Neurological Sciences*, 4 (1) pp. 18-23.       * Fateme, S., Hassanzadeh-Taheri, M., Fatemi, S., Moodi, H., Hosseini, M., Akbari, A., Doostabadi, M. (2017) ‘Evaluating the impact of laughter therapy on hope, self-efficacy, and pain control in patients with chronic low back pain’, *Pharmacophore*, 8 (6) e-1173663.   **Excluded:**   * Xumin et al (2015) ‘[Analysis of the relationship between hope and curative effect of spinal fusion in patients with chronic low back pain](http://www.lingnanwaike.com/EN/Y2015/V15/I05/587)’, *Lingnan Modern Clinics*.   **Reason: Not in English** |

**STEP 1 (continued): Search Process**

**Figure 14. A screenshot of the second Google Scholar search strategy** (NB: Unable to limit language)

A screenshot of a computer

Description automatically generated

**STEP 1 (continued): Search Process**

**Figure 15. A table outlining the results for Google Scholar (search 2).**

|  |  |  |  |
| --- | --- | --- | --- |
| **Electronic Database** | No. of articles | Met eligibility criteria | Articles: |
| GoogleScholar Search 2 | 66 | 4 | **Accepted:**   * Abdolghaderi, M. Kafi, S., Saberi, A. and Ariaporan, S. (2018) ‘Effectiveness of Mindfulness-Based Cognitive Therapy on Hope and Pain Beliefs of Patients with Chronic Low Back Pain’, *Caspian Journal of Neurological Sciences*, 4 (1) pp. 18-23. * Fateme, S., Hassanzadeh-Taheri, M., Fatemi, S., Moodi, H., Hosseini, M., Akbari, A., Doostabadi, M. (2017) ‘Evaluating the impact of laughter therapy on hope, self-efficacy, and pain control in patients with chronic low back pain’, *Pharmacophore*, 8 (6) e-1173663. * Razavi, S., Aboalghasimi, S., Akbari, B. and Nadirinabi, B. (2022) ‘The effectiveness of Cognitive Therapy on Hope and Pain management in Women with Chronic Pain’, *Preventative Care in Nursing and Midwifery Journal,* 12 (2) pp. 18-23. * Wojtyna, E., Palt, L., & Popiolek, K. (2015). ‘From Polyanna syndrome to Eeyore's Corner? Hope and pain in patients with chronic low back pain’. Polish Psychological Bulletin, 46 (1) pp. 96-103.   **Excluded:**   * Xumin et al (2015) ‘[Analysis of the relationship between hope and curative effect of spinal fusion in patients with chronic low back pain](http://www.lingnanwaike.com/EN/Y2015/V15/I05/587)’, *Lingnan Modern Clinics*   **Reason not included: Not in English. Surgical management.**   * Eaves, E., Nichter, M. and Ritenbaugh. C. (2016) ‘[Ways of hoping: navigating the paradox of hope and despair in chronic pain](https://link.springer.com/article/10.1007/s11013-015-9465-4)’, *Culture, medicine and Psychiatry’*, 40 pp. 35-58.   **Reason not included: Participants had temporomandibular disorders.**   * Katsimigos, O'Beirne, S. and Harmon, D. (2021) 'Hope and chronic pain - a systematic review', *Irish Journal of Medical Sciences*, 190 pp. 307-213.  **Reason not included: Covered a variety of chronic illnesses, not just LBP.** |

**STEP 1 (continued): Search Process**

**Figure 16. A screenshot of the ScienceDirect search strategy**

**A screenshot of a computer

Description automatically generated**

**Figure 17. A table outlining the results for ScienceDirect.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Electronic Database** | No. of articles | Met eligibility criteria | Articles: |
| ScienceDirect | 36 | 1 | Corbett, M., Foster, N. and Ong, B. (2007) 'Living with low back pain - Stories of hope and despair', *Social science and Medicine*, 65 (8) pp. 1584-1594. doi:10.1016/j.socscimed.2007.06.008 |

**STEP 1 (continued): Search Process**

**Figure 18.** The search results for the Hope-Lit Database, accessed via The University of Alberta website.

Selected Sub-category = Chronic pain

**Search Results:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| Hope-Lit  Database | 13 | 3 | **Accepted:**   * Corbett, M., Foster, N. and Ong, B. (2007) 'Living with low back pain - Stories of hope and despair', *Social science and Medicine*, 65 (8) pp. 1584-1594. doi:10.1016/j.socscimed.2007.06.008 * Toye, F. and Barker, K. (2012). I can’t see any reason for stopping doing anything, but I might have to do it differently’ – restoring hope to patients with persistent non-specific low back pain – a qualitative study. Disability & Rehabilitation, 34 (11) pp. 894-903. * Wojtyna, E., Palt, L., & Popiolek, K. (2015). ‘From Polyanna syndrome to Eeyore's Corner? Hope and pain in patients with chronic low back pain’. Polish Psychological Bulletin, 46 (1) pp. 96-103.   **Excluded:**   * Eaves, E. R, (2016). Ways of hoping: Navigating the paradox of hope and despair in chronic pain. Culture, Medicine &Psychiatry, 40(1), 35-58. **Reason not included:** TMJ Disorders, not LBP * Eaves, E. R., Ritenbaugh, C., Nichter, M., Hopkins, A. L., & Sherman, K. J. (2014). Modes of hoping: Understanding hope and expectation in the context of a clinical trial of complementary and alternative medicine for chronic pain. Explore: The Journal of Science & Healing, 10(4), 225-232.  **Reason not included:** TMJ Disorders, not LBP * Edey, W., King, R. L., Larsen, D. J., & Stege, R. (2016). The "Being Hopeful in the Face of Chronic Pain" program: A counseling program for people experiencing chronic pain. Journal for Specialists in Group Work, 41(2), 161-187. **Reason not included:** Chronic pain, multiple reasons – not solely LBP * Howell, A. J., Jacobson, R. M., & Larsen, D. J. (2015). Enhanced psychological health among chronic pain clients engaged in hope-focused group counseling. The Counseling Psychologist, 43 (4) pp. 586-613.  **Reason not included:** Chronic pain, multiple reasons/diagnoses – not solely LBP * Jacobson, R. (2012). Hope amidst the pain: Effects of a hope-focused intervention for individuals suffering from chronic pain. Unpublished manuscript, Department of Psychology, Grant MacEwan University, Edmonton, AB, Canada.    **Reason not included:** unable to access full text * Larsen, D. J., King, R. L., Stege, R., & Egeli, N. A. (2015). Hope in a strengths-based group activity for individuals with chronic pain. Counselling Psychology Quarterly, 28 (2) pp. 175-199.  **Reason not included:** Chronic pain, multiple reasons/diagnoses – not solely LBP * Säellfors, C., Fasth, A., & Hallberg, L.R.M. (2002). Oscillating between hope and despair--A qualitative study. *Child: Care, Health & Development*, 28 (6) pp. 495-505.**Reason not included:** Children, not adults. * Taylor, R. R. (2006). Instilling hope in people with chronic conditions. In Renee R. Taylor’s Cognitive behavioral therapy for chronic illness and disability (pp. 172-183). New York, NY: Springer Science & Business Media, Inc. HSC **Reason not included:** Chronic pain, multiple reasons/diagnoses – not solely LBP * Underwood, R. (2009). ‘Hope in the face of chronic pain and mortality’. Pastoral Psychology, 58 (5/6) pp. 655-665. **Reason not included:** Not LBP * Wright, M. A., Wren, A. A., Somers, T. J., Goetz, M. C., Fras, A. M., Huh, B. K., Rogers, L. L., & Keefe, F. J. (2011). ‘Pain acceptance, hope, and optimism: Relationships to pain and adjustment in patients with chronic musculoskeletal pain’. The Journal of Pain, 12 (11) pp. 1155-1162.  **Reason not included:** Chronic MSK pain, multiple reasons – not solely LBP. |

**STEP 1 (continued):  
Figure. 19. A table summarising the articles which met the eligibility criteria following the first systematic search.**

|  |  |
| --- | --- |
| **Database** | **Number of articles** |
| MEDLINE | 18 |
| CINAHL | 13 |
| AMED | 0 |
| PEDro | 43 |
| PubMed | 24 |
| SPORTDiscus | 6 |
| Google Scholar | 72 |
| ScienceDirect | 36 |
| Hope-Lit database | 13 |
| **Total** | **225** |
| **Removed duplicates** | **47** |
| **Records screened** | **178** (excluded 161 by title/abstract) |
| **Records sought for retrieval** | **16** (1 not available full text) |
| **Reports excluded** | **10** |
| **Included** | **6** (2 x qualitative and 4 x quantitative articles) |

**Qualitative articles (x2): Quantitative articles (x4)**

* Corbett, M., Foster, N. and Ong, B. (2007)
  + - * Abdolghaderi et al (2018)
      * Fateme et al (2017)
      * Razavi et al (2022)
      * Wojtyna, E., Palt, L., & Popiolek, K. (2015).
* Toye and Barker (2012)

**STEP 2: Immersive reading, coding and exploring how the studies relate.**

**Figure. 20. A table outlining the coding of the two qualitative articles.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **First order coding**  (Participant verbatim quotes): | **Second order coding**  (Study author reported findings) | **Third order constructs** (Meta-ethnography interpretation) |
| **Article 1.**  Corbett, M., Foster, N. and Ong, B. (2007) | A text on a white background  Description automatically generated | **Insufficient medical and scientific explanation.**   * People with CLBP want/need to know the cause of their pain, before they are willing make next steps towards adapting their lifestyle. * However, identifying the specific underlying pathology of CLBP is notoriously difficult and often there is not a structural cause. * They are often labelled ‘non-specific low back pain’ which makes acceptance difficult. * They feel like they are not believed.  Symptoms not legitimised. | **Diagnostic uncertainty**   * People with CLBP want a clear diagnosis or acceptable explanation for their symptoms. * +/- diagnostic investigations |
| A text on a white background  Description automatically generated | **Expected linear progression:**   * People with CLBP believe a clear diagnosis leads to effective treatment and possible cure. When this doesn’t happen, it increases uncertainty and reduces hope. * Even more pronounced when HCPs suggest key diagnostic tests will not help. * Without a clear diagnosis, they perceive their prognosis and the chance of a cure is limited. |
| **A text on a page  Description automatically generated** | **Psychological components/despair resulting from living with chronic pain**   * Psychological despair caused by persistent pain * Nearly all respondents considered the psychological aspects of CLBP as inextricably linked to physical aspects. * Managing pain is essential for psychological well-being. | **Prognostic uncertainty**   * Psychological component/well-being. |
| **A text on a page  Description automatically generated** | * The **fluctuating symptoms / unpredictable nature of CLBP** makes it difficult to manage causing a cyclic process of hope and despair, mixed with uncertainty. * People with CLBP believe nothing can be done, but do not want to live with hopelessness, thus raises doubt. * Doubt can lead to hopelessness, but it can also redirect the patient towards hope. | **Prognostic uncertainty**   * Unpredictable symptoms |
| **A close up of text  Description automatically generated**  A close up of a letter  Description automatically generated | **Worry and fear for the future**   * This pervades nearly all interviews. * Linked with unknown cause/unclear diagnosis and unpredictable/fluctuating symptoms, it creates uncertainty of what their future will look like. | **Prognostic uncertainty**   * Fear of the unknown * Impact on their self-identity / future |
|  | **A close up of text  Description automatically generated**  **A text on a white background  Description automatically generated** | **Worries for the future is also affected by social and cultural influences:**   * Social networks, culture and relationships shapes beliefs and expectations. * Fear of losing relationships (family, marriage) and employment. | **Prognostic uncertainty**   * Fear of the unknown * Impact on their self-identity / future |
| **Article 2.**  Toye, & Barker, (2012) | **A close up of a text  Description automatically generated**  **A close up of text  Description automatically generated**    **A black text on a white background  Description automatically generated** | **Finding hope for the future was central to good outcomes.**  Individuals with CLBP restored hope by making the following three changes:   1. **Deconstructing fears**   e.g. fear of movement, a certain activity and/or needing to protect themselves from further damage.  Those worse at one year described a fear of loss | **Prognostic uncertainty**   * Fear: Impact on self-identity |
|  | A close up of black text  Description automatically generated  **A close up of text  Description automatically generatedA white background with black text  Description automatically generatedA close up of text  Description automatically generated** | 1. **Constructing an acceptable explanatory model**  * Patients who restored hope accepted the biopsychosocial model and embraced a psychological explanation, but a physical explanation was still important. * Viewing the body as ‘out of balance’, not broken helped to resolve the contradiction between needing a medical explanation / clear diagnosis. * **Those who were worse at one year adhered to a medical explanation** (biomedical model) and were unable to make acceptable changes to their lifestyle. | **Diagnostic uncertainty**   * Biomedical focus vs accepting a biopsychosocial explanation |
| **A close up of text  Description automatically generated** | 1. **Reconstructing self-identify by making acceptable changes to activity levels**  * **A text on a page    Description automatically generatedThose worse at one year felt loss of self-identity and couldn’t limit activities or make acceptable changes.** | **Prognostic uncertainty**   * Impact on self-identity |

**These findings support Mishel’s theory on uncertainty in healthcare which states that regardless of the underlying health condition, uncertainty prevails when people cannot cognitively appraise information on the state of illness, especially if the course of the disease is unpredictable, but also if there is a lack of information about the diagnosis and/or prognosis (Mishel, 1988). Moreover, Soundy et al (2014) who developed a framework for hope also recognise that hope is particularly challenged at time of onset, during change or uncertainty. Therefore, this became a critical turning point in the analytical process and the concept of uncertainty became a new line of enquiry.**

**STEP 3: Second systematic search**

**Eligibility criteria refined:**

* Population: adults (18-70yrs) with chronic low back pain (>3months)
* Articles that discussed hope ***or***uncertainty from the perspective of the individual with CLBP in the results section of the abstract.

**STEP 3 (continued): Second systematic search**

**Figure 21.** A table outlining the databases and search terms for the second systematic search.

|  |  |
| --- | --- |
| **Database** | **Search Terms** |
| MEDLINE | ‘Uncertainty OR Uncertain OR Intolerance of uncertainty OR Possibility’ AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ |
| CINAHL | ‘Uncertainty OR Uncertain OR Intolerance of uncertainty OR Possibility’ AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ |
| PubMed | ‘Uncertainty[Title/Abstract] OR Uncertain[Title/Abstract] OR Intolerance of uncertainty[Title/Abstract] OR Possibility[Title/Abstract] AND ‘Chronic low back pain’[Title/Abstract] OR ‘non-specific low back pain’[Title/Abstract] OR ‘persistent low back pain’[Title/Abstract] |
| AMED | ‘Uncertainty OR Uncertain OR Intolerance of uncertainty OR Possibility’ AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ |
| PEDro | ‘persistent low back pain’ uncertain\*  ‘chronic low back pain’ uncertain\*  ‘non-specific low back pain’ uncertain\* |
| SPORTDiscus | ‘Uncertainty OR Uncertain OR Intolerance of uncertainty OR Possibility’ AND ‘Chronic low back pain’ OR ‘non-specific low back pain’ OR ‘persistent low back pain’ |
| Google Scholar | allintitle: uncertainty "low back pain". 2003-2024. |
| ScienceDirect | ‘Uncertainty’ AND ‘low back pain’ - in title and abstract. |

**STEP 3 (continued): Search Process**

A screenshot of a computer

Description automatically generated**Figure 22. NHS Knowledge and library hub search strategy screenshot.**

Used search 3 then limited database to: CINAHL.

**STEP 3 (continued): Search Process**

**Figure 23. A table outlining the search results for CINAHL.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| CINAHL | 99 | 0 | **Excluded:**   * Bourke, M., Ferguson, D. & Cooke, M. (2022) ‘Patient experiences of self-management for chronic low back pain: a qualitative study’, *Physical Therapy and Rehabilitation Journal*, 102 pp. 1-10. doi.org/10.1093/ptj/pzac030   **Reason not included:** It didn’t discuss or measure hope or uncertainty, rather the   key theme of the model was ‘fluctuating uncertainty’ which was developed from 6 sub themes |

**STEP 3 (continued): Search Process**

**A screenshot of a computer

Description automatically generatedFigure 24. A screenshot of the search process for MEDLINE.**

**STEP 3 (continued): Search Process**

**Figure 25. A table outlining the search results for MEDLINE.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| MEDLINE | 234 | 1 | **Accepted:**   * Choi, J.W., So, W.Y., and Kim, K., (2022) ‘The Mediating Effects of Social Support on the Relationship between Uncertainty and Quality of Life among Patients with Chronic Low Back Pain: A Cross-Sectional Survey’, *Healthcare*, 10 (9) e1805. [doi.org/10.3390/healthcare10091805](https://doi.org/10.3390/healthcare10091805).   **Excluded:**   * Slade, S., Molloy, E. and Keating, J. (2012) ‘The dilemma of diagnostic uncertainty when treating people with chronic LBP: a qualitative study’, *Clinical rehabilitation,* 26 (6) pp. 558-569   **Reason not included:** Physiotherapists perceptions, not patients.   * Bourke, M., Ferguson, D. & Cooke, M. (2022) ‘Patient experiences of self-management for chronic low back pain: a qualitative study’, *Physical Therapy and Rehabilitation Journal*, 102 pp. 1-10. doi.org/10.1093/ptj/pzac030   **Reason not included:** It didn’t discuss or measure hope or uncertainty, rather the   key theme of the model was ‘fluctuating uncertainty’ which was developed from 6   sub themes. |

**STEP 3 (continued): Search Process**

**Figure 26. A screenshot of the AMED (available through OVID platform) search strategy:**

**A screenshot of a computer

Description automatically generated**

**Figure 27. A table outlining the search results for AMED:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| AMED | 17 | 0 |  |

**STEP 3 (continued): Search Process**

**Figure 28. Screenshots (x3) of the PEDro search strategies.**

**A screenshot of a computer

Description automatically generatedA screenshot of a search box

Description automatically generated**Search 1: Search 3:

**A screenshot of a web page

Description automatically generated**Search 2:

**Figure 29.** **A table outlining the search results for PEDro**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| PEDro (Search 1) | 30 | 0 |  |
| PEDro (Search 2) | 3 | 0 |  |
| PEDro (Search 3) | 14 | 0 |  |

**STEP 3 (continued): Search Process**

**Figure 30.** **A screenshot of the PudMed search strategy.**

**A screenshot of a computer

Description automatically generated**

**Figure 31. A table outlining the search results for PubMed**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| PubMed | 224 | 1 | **Accepted:**   * Choi, J.W., So, W.Y., and Kim, K., (2022) ‘The Mediating Effects of Social Support on the Relationship between Uncertainty and Quality of Life among Patients with Chronic Low Back Pain: A Cross-Sectional Survey’, *Healthcare*, 10 (9) e1805. [doi.org/10.3390/healthcare10091805](https://doi.org/10.3390/healthcare10091805).   **Excluded:**   * Slade, S., Molloy, E. and Keating, J. (2012) ‘The dilemma of diagnostic uncertainty when treating people with chronic LBP: a qualitative study’, *Clinical rehabilitation*, 26 (6) pp. 558-569. **Reason not included:** Physiotherapist’s perceptions, not patients. * Serbic, D and Pincus, T. (2015) ‘Diagnostic uncertainty and recall bias in chronic low back pain’, *Bone & Joint*, 155 (8) pp. 1540-1546. **Reason not included:** No outcome measure of hope or discussion on hope or uncertainty from the participants perceptive. |

**STEP 3 (continued): Search Process**

**Figure 32. A screenshot of the SPORTDiscus search strategy.**

**A screenshot of a computer

Description automatically generated**

**Figure 33. A table outlining the search results for SPORTDiscus.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Database** | No. of articles | Met eligibility criteria | Articles: |
| SPORTDiscus | 0 | 0 |  |

**A screenshot of a search box

Description automatically generatedSTEP 3 (continued): Search Process**

**Figure 34. A screenshot of the Google Scholar search strategy**   
(NB: Unable to limit language)

**Figure 35. A table outlining the results for Google Scholar.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Electronic Database** | No. of articles | Met eligibility criteria | Articles: |
| Google Scholar | 12 | 3 | **Accepted:**   * Choi, J.W., So, W.Y., and Kim, K., (2022) ‘The Mediating Effects of Social Support on the Relationship between Uncertainty and Quality of Life among Patients with Chronic Low Back Pain: A Cross-Sectional Survey’, *Healthcare*, 10 (9) e1805. [doi.org/10.3390/healthcare10091805](https://doi.org/10.3390/healthcare10091805). * Costa. N, Butler, P., Dillon, M., Mescouto, K., Olson, R., Forbes, R. and Setchell, J. (2022a) “I felt uncertain about my whole future” – a qualitative investigation of people’s experiences of navigating uncertainty when seeking care for their low back pain’, *PAIN*, 164 (12) pp. 2749-2758. * Costa, N., Olson, R., Mescouto, K., Hodges, P.W., Dillon, M., Evans, K., Walsh, K., Jensen, N. and Setchell, J. (2023) ‘Uncertainty in low back pain care – insights from an ethnographic study’, *Disability and Rehabilitation*, 45 (5) pp. 784-795.   **Excluded:**   * Slade, S., Molloy, E. and Keating, J. (2012) ‘The dilemma of diagnostic uncertainty when treating people with chronic LBP: a qualitative study’, *Clinical rehabilitation*, 26 (6) pp. 558-569.  **Reason not included:** Physiotherapist’s perception, not patients. * Costa. N, Mescouto, K., Dillon, M., Olson, R., Butler, P., Forbes, R. and Setchell, J. (2022b) ‘The ubiquity of uncertainty in low back pain care’, *Social science and medicine*, 313, e115422.  **Reason not included:** Physiotherapists perception, not patients. |

**STEP 3 (continued): Search Process**

**A screenshot of a computer

Description automatically generatedFigure 36. A screenshot of the ScienceDirect search strategy.**

**STEP 3 (continued):**

**Figure 37. A table outlining the results for ScienceDirect.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Electronic Database** | No. of articles | Met eligibility criteria | Articles: |
| ScienceDirect | 84 | 0 | **Excluded:**   * Koleck et al (2006) ‘Psycho-social factors and coping strategies as predictors of chronic evolution and quality of life in patients with low back pain: A prospective study’, *European journal of pain*,  **Reason not included:** Predictors of developing chronic pain – not patients with chronic pain. * Serbic, D and Pincus, T. (2015) ‘Diagnostic uncertainty and recall bias in chronic low back pain’, *Bone & Joint*, 155 (8) pp. 1540-1546. = Higher levels of depression and disability were found in the group with diagnostic uncertainty, but levels of pain intensity did not differ between the groups.   **Reason not included:** No outcome measure of hope or discussion on hope or uncertainty   from the participants perceptive.   * Costa. N, Mescouto, K., Dillon, M., Olson, R., Butler, P., Forbes, R. and Setchell, J. (2022b) ‘The ubiquity of uncertainty in low back pain care’, *Social science and medicine*, 313, e115422. **Reason not included:** Physiotherapist’s perception, not the patients. |

**STEP 3 (continued):**

**Figure 38. A table summarising the articles which met the eligibility criteria following the second systematic search.**

|  |  |
| --- | --- |
| **Database** | **Number of articles** |
| MEDLINE | 234 |
| CINAHL | 99 |
| AMED | 17 |
| PEDro | 47 |
| PubMed | 224 |
| SPORTDiscus | 0 |
| Google Scholar | 12 |
| ScienceDirect | 84 |
| **Total** | **717** |
| **Removed duplicates** | **51** |
| **Records screened** | **666** (excluded 658 by title/abstract) |
| **Records sought for retrieval** | **8** |
| **Reports excluded** | **5** |
| **Included** | **3** (2 x qualitative and 1 x quantitative articles) |

**Qualitative articles (x2)**

**Quantitative articles (x1)**

* Choi, J.W., So, W.Y., and Kim, K. (2022)
* Costa et al (2022a)
* Costa et al (2023)

**STEP 2: Further immersive reading, coding and exploring how studies relate.**

**Figure 39. A table outlining the coding of the two qualitative articles on uncertainty in people with CLBP.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **First order coding**  (Participant verbatim quotes): | **Second order coding**  (Study author reported findings) | **Third order constructs** (Meta-ethnography interpretation) |
| **Costa et al (2022a)**  **(Inclusion criteria:** All participants had experienced LBP for at least 2 years) | **A close up of text  Description automatically generated**  **A text on a white background  Description automatically generated**  **A close up of a text  Description automatically generated** | **Uncertainty was situated in….**  **Time (past, present and future).**   * Certainty of having a specific diagnosis and the certainty of not having one both produced uncertainty about their future. e.g. when MRI results don’t correlate with their symptoms or if incidental findings arose, it caused further uncertainty regarding the cause, future episodes and management. | **Diagnostic uncertainty**   * Patients want a clear diagnosis or acceptable explanation for their symptoms. * +/- diagnostic investigations |
| **A text on a screen  Description automatically generated** | **Clinicians – can they help me?**   * Ability and willingness to help | **The clinical encounter** |
|  | **A white text on a white background  Description automatically generated** | * Level of expertise * Listened to and understood |  |
| **A text on a page  Description automatically generatedA text on a white background  Description automatically generated** | **What clinicians are asking?**   * Uncertainty around what/why clinicians are asking specific questions. * Exploring concerns * Honesty about uncertainty) | **The clinical encounter**   * Identifying psychosocial factors * Epistemic humility |
|  | **A close up of text  Description automatically generated**  **A text on a screen  Description automatically generated**  **A text on a page  Description automatically generated** | **Am I being taken seriously? (Legitimacy of symptoms)**  Uncertainty and negative emotions are produced when patients feel that they are heard, understood or believed. | **The clinical encounter**   * Epistemic humility |
| **Costa et al (2023)** | A text on a white background  Description automatically generated  **A close up of text  Description automatically generated**  **A close up of text  Description automatically generated** | **Sources of uncertainty**   * **Patient**   Expects definitive answers as they seek information about the cause (including structural causes), prognosis and imaging findings (but often a mismatch between MRI results and clinical presentation).   * **Clinician – Often neglect uncertainty during clinical interactions due to the complexity of the condition.** There is a need for clinicians to disclose uncertainty.   Uncertainty was also produced during interactions with the clinician – e.g. questions around **A close up of text  Description automatically generated**aggravating activities, patients find it challenging to answer, as activities that cause pain are not consistent. These conversations were filled with emotions (frustration, anger etc). | **Diagnostic and prognostic uncertainty**  **The clinical encounter**   * Epistemic humility vs epistemic injustice |
| **A close up of a text  Description automatically generated**  **A text on a white background  Description automatically generated**  **A close up of a text  Description automatically generated** | **Neglecting complexity**   * Clinicians try and decrease uncertainty and its emotional effects by neglecting its complexity and focusing on the psychosocial or pathoanatomical causes, but not both.   Having tried many treatment interventions which have failed and seen by numerous or various clinicians, patients felt hopeless. | **The clinical encounter**   * Epistemic humility vs epistemic injustice |
| **A screenshot of a computer message  Description automatically generated** | **Attending to uncertainty**   * Clinicians often reduce it, as opposed to attend to it. * They reduce uncertainty by emphasising a definite likelihood of improvement (common strategy). | **The clinical encounter**   * Epistemic humility vs epistemic injustice |

**Figure 40.**  Exploring how the core four studies on hope and uncertainty translate.

**STEP 4: Iterative process of idea generation**

**Figure 41: A table outlining the first and second research question and its line of argument synthesis (steps 1-4)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Step 1 (the question):**   * What are the main psychosocial factors that people with CLBP commonly report that they are uncertain about? * How can HCPs influence these psychosocial factors (either positively or negatively) affecting the outcomes for people with CLBP? | | | | | |
| **Step 2: Potential explanations** | | | | | |
| **What I searched?** | **Why?** | **Article:** | | **Conclusions:** | |
| Uncertainty  Chronic low back pain  2003-2024  Google scholar | What do patients with CLBP feel most commonly uncertain about? | Costa et al (2023)  Costa et al (2022a) | | **Diagnostic uncertainty**   * Cause * Imaging/investigations   **The clinical encounter**   * Ability (expertise) and willingness to help * Listened to and understood * Aspects of the examination * Exploring concerns * Honesty + open discussions about uncertainty | |
| \*First systematic search | What do patients with CLBP feel most commonly uncertain about? | Corbett, M., Foster, N. and Ong, B. (2007) | | **Diagnostic uncertainty**   * Clear diagnosis or acceptable explanation for their symptoms * Imaging/investigations   **Prognostic uncertainty**   * Psychological component/well-being. * Unpredictable symptoms * Fear of the unknown * Impact on their self-identity / future | |
| \*First systematic search | What do patients with CLBP feel most commonly uncertain about? | Toye and Barker (2012) | | **Diagnostic uncertainty**   * Biomedical focus vs accepting a biopsychosocial explanation   **Prognostic uncertainty**   * Fear: Impact on self-identity * Impact on self-identity | |
| Framework for hope | What do patients with CLBP feel most commonly uncertain about? | Soundy et al (2014) | | **\*Impact on their future and self-identity**  Systematic review – 10 studies.  Hope is severely challenged at times of disease onset, during change or uncertainty. Individuals were overwhelmed by impact on their future.  Goals are key – but they must be meaningful.  HCPs need to understand the patients’ self-identity. | |
| Low back pain,  Epistemic Humility  2003-2024  Google scholar | How does the therapeutic relationship between the patient and clinician affect uncertainty? | Buchman et al (2017) ‘Investigating trust, expertise and epistemic injustice in chronic pain’, *Bioethical Inquiry,* 14 pp. 31-42. | | Trust, expertise and knowledge is essential for a therapeutic relationship.  We should strive for epistemic humility and avoid epistemic injustice. | |
| **Step 3: Testing and modifying the ideas/explanations**  Q: Do certain aspects during the consultation lead to specific aspects on the maladaptive and adaptive emotion regulation cycles?  Is there a negative or positive? | | | | | |
| ***Emotion regulation pathways*** | | | | | |
| ***Adaptive emotional regulation*** | | | ***Concept*** | | ***Maladaptive emotional regulation*** |
| * Accepting an explanatory model for pain (Toye and Barker, 2012). * Thorough examination with justifications. * Accepting of the biopsychosocial model (Bourke et al, 2022; Spink, A., Wagner, I. and Orrock, P. 2021). | | | **Examination and diagnostic investigations**  **How can the examination or diagnostic explanation go wrong, or right?** | | * Diagnostic uncertainty * Lack of a thorough examination +/- diagnostic investigations. * Fixed on the biomedical model (Toye and Barker, 2012). |
| * Patient centred care.  Setting meaningful goals. * Active listening and feeling understood. * Epistemic humility. | | | **Interactions with the clinician**  **Is there certain interactions that work?**    (Buchman et al 2017; Costa et al, 2022; Costa et al 2023; Darlow et al, 2013; Lian et al, 2021; Serbic and Pincus, 2015; Slade et al, 2012). | | * Poor patient-clinician relationship. * Symptoms not legitimised. * Epistemic injustice |
| * Sufficient symptom management. * Learning to live with pain, whilst maintaining an acceptable self-identity. | | | **Physiological symptoms and pain perception**  **How does pain perception link and how does clinician interaction impact that in a good or bad way?**  (Bourke et al, 2022; Wojtyna, E., Palt, L. and Popiolek, K., 2015) | | Fluctuating symptoms/episodic nature of CLBP. People with CLBP view their symptoms as a threat due to its unpredictable nature   * Self-doubt * Low pain self-efficacy * Negative pain perception and its impact on their future. |
| **As above**  Bandura’s self-efficacy theory (1994)  Hope is negatively correlated with self-efficacy, explored within chronic musculoskeletal pain (Or et al, 2021). | | | | | |
| * Identify and deconstructing fears * Supervised (+/- group) exercise. * Graded exposure. * Pacing. | | | **Fear of the unknown**  How does fear of the unknown increase IU?  What helps or doesn’t help fear?  (Carleton, 2016) | | There is statistically significant link between fear of the unknown and anxiety disorders + depression.  Fear of losing self/identity. |
| * Appropriate psychological support. * CBT. * Laughter therapy. | | | **History of psychological disorders** | | = Mental health disorders / depression = leads to maladaptive emotional regulation (Leite et al, 2019)  Conditions such as: Anxiety disorders, Depression, Perceived stress, OCD, Agoraphobia |
| **Step 4: Identification of part of an idea**  The information above outlines:   * Factors that people with CLBP commonly feel uncertain about * How the patient-clinical interaction can influence the outcome of the patient both positively and negatively. | | | | | |

**STEP 4: Iterative process of idea generation**

**Figure 42: A table outlining the third research question and its line of argument synthesis (steps 1-4)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Step 1 (the question):** How are the concepts of hope and uncertainty linked? | | | | | | |
| **Step 2: Potential explanations** | | | | | | |
| **What I searched?** | **Why?** | | **Article:** | **Conclusions:** | | |
| Intolerance of uncertainty  2020-2024  Google scholar | What is IU? | | Sandhu, T., Xiao, B. and Lawson, R. (2023) | * Outlines the concept of IU and underlying mechanisms   Forms of uncertainty:  1st order uncertainty = risk, is incomplete / estimated.  2nd order uncertainty = uncertainty about 1st order uncertainty  Higher order uncertainty = how frequently 1st order uncertainty changes  Structural uncertainty = the number of probabilistic relationships  Early life stresses may explain the variances in cognitive outcomes and beliefs about uncertainty. | | |
| Intolerance of uncertainty AND Hope  2014-2024  Google scholar | How are hope and uncertainty linked? | | Demirtas and Yildiz (2019) | * The link between hope and uncertainty is **cognitive flexibility**, but there is limited research to support this direct link. * Individuals who are cognitive flexible are tolerant of uncertainty and able to cope with internal and external stresses. * Hopelessness is negatively correlated with cognitive flexibility * Hopelessness is positively correlated with IU and preserved stress * Cognitive flexibility is negatively correlated with preserved stress * Cognitive flexibility is negatively correlated with IU | | |
| Intolerance of uncertainty AND Emotion regulation  2014-2024  Google scholar | How is IU linked with emotion regulation? | | Ouellet et al (2019) | * The study explored how IU contributes to worry. * Linked through two aspects of the ERM (negative problem orientation and negative emotion orientation). * Thus provides evidence for an integrated model (IUM and ERM) | | |
| Intolerance of Uncertainty AND Emotion regulation  Google scholar  2003-2024 | How do emotion regulation strategies influence tolerance of uncertainty? | | Sahib et al (2023) | Systematic review and meta-analysis. 91 studies.  Positive correlation between maladaptive ERS and intolerance of uncertainty Negative correlation between adaptive ERS and intolerance of uncertainty. | | |
| 3 x quantitative studies from the initial systematic search explored CBT, mindfulness and laughter therapy as treatment interventions for improving hope. | How do we address maladaptive emotion regulation strategies in people with CLBP?  How do we improve hope? | | Abdolghaderi et al (2018) | Mindfulness based cognitive behavioural therapy significantly increased hope (agency and pathway) but had NO effect on pain beliefs  Quasi-experimental study. 30 participants. Age: 30-50years. All women. LBP > 6months. Two groups: MBCT 8week course vs Control | | |
| Razavi et al (2022) | To explore the effectiveness of cognitive therapy on hope and pain in women with CLBP.  Quasi-experimental study with pre- and post- test design and control group.  20 participants (10 in each group). All women. Chronic LBP.  CBT statistically significantly improved hope and self-management abilities and reduced pain. | | |
| Fateme et al (2017) | To evaluate the effect of laughter therapy on hope, self-efficacy and pain control in patients. Semi-experimental study. Pre and post-test design with one experimental group and one control.  Convenient sampling. 30 patients.  Laughter therapy increased post-test scores of hope and self-efficacy in the experimental group and reduced pain. | | |
| Framework for hope | Is there already a Framework for Hope? | | Soundy et al (2014) | Systematic review – 10 studies.  Hope is severely challenged at times of disease onset, during change or uncertainty. Individuals were overwhelmed by impact on their future.  Goals are key – but they must be meaningful.  HCPs need to understand the patients’ self-identity. | | |
| **Step 3: Testing and modifying the ideas/explanations**  Is cognitive flexibility the key to efficient emotion regulation?  Does high levels of cognitive flexibility improve hope and uncertainty? | | | | | | |
| **What I searched?** | | **Why?** | | | **Article:** | **Conclusions:** |
| Cognitive flexibility  Referenced in Bourke et al 2022  (Citation chasing) | | How does cognitive flexibility affect emotion regulation? | | | Vowles and McMracken (2009) | It is well established that a predisposing factor for stress and depression is hopelessness and this relationship is dependent on the ability of an individual to be psychologically flexible.  When an individual is psychologically flexible, they are able to confidently respond and adapt to different situations and are more tolerate of conflict and uncertainty, subsequently enhancing levels of hope. |
| Cognitive flexibility AND emotion regulation  2014-2024  Google scholar | | How does cognitive flexibility affect emotion regulation? | | | Gentili et al, (2019) | Psychological Flexibility as a resilience factor in Individuals with Chronic Pain. |
| **Step 4: Identification of part of an idea**   * Hope and uncertainty are linked and dependent on how the individual regulates their emotions and their ERS. * A key influential factor is cognitive flexibility, but more research is required into how we improve/address it. * Some evidence to show CBT/mindfulness improves hope but doesn’t change pain perception. | | | | | | |

**STEP 4: Iterative process of idea generation**

**Figure 43: A table outlining the fourth research question and its line of argument synthesis (steps 1-4)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Step 1 (the question):**  Are there any conditions or intrinsic factors that predispose an individual to be less tolerant of uncertainty? | | | | | |
| **Step 2: Potential explanations:** | | | | | |
| **What I searched?** | | **Conditions or intrinsic factors** | **Article:** | | **Conclusions:** |
| Uncertainty AND Cognitive processing  Google scholar  2003-2024 | | Fear of the unknown | Carleton (2016) | | People with anxiety related disorders or depression have statistically significantly higher fear of the unknown.  Important to identify ‘unknowns’ at each level of emotion processing. |
| Hope AND  Depression  2003-2024  Google scholar | | Psychological conditions  e.g anxiety and depression | Leite et al (2019) | | Systematic review, 7 articles.  People with depression have low levels of hope – (proven link across several illnesses, but not specifically LBP).  Mental health disorders / depression= leads to maladaptive emotional regulation  Conditions such as: Anxiety disorders, Depression, Perceived stress, OCD, Agoraphobia |
| Uncertainty,  Chronic low back pain  Management  Google scholar  2003-2024 | | Fluctuating nature of LBP | Bourke et al (2022) | | Qualitative interviews. Grounded Theory. 9 participants  6 sub-themes:  The main sub theme was self-doubt in their ability to cope with fluctuating symptoms and its impact on day-to-day coping. |
| Uncertainty  AND Depression  2003-2023  Google scholar | | Depression | Serbic and Pincus (2015) | | = Higher levels of depression and disability were found in the group with diagnostic uncertainty, but levels of pain intensity did not differ between the groups. |
| Pain perception  Hope  Chronic low back pain  2003-2024  Google scholar | | How does their pain perception effect hope? | Wojtyna et al (2015) | | Aim: Exploring mechanisms by which hope affects pain perception.  Cross sectional study.  150 patients with CLBP.  Level of state hope depends on their previous experiences of pain and the presence of pain at that moment when they undertake an outcome measure of hope.  People who had high current or previous levels of pain had significantly lower levels of state-hope than those not in pain.  Linked with stress and depression.  In people who have previously experienced low pain intensity’s, hope-state may increase when pain re-occurs. Whereas severe pain switches off state-hope. |
| **Step 3: Testing and modifying the ideas/explanations**  Do certain conditions lead to the maladaptive pathway? Do certain conditions enhance pain, fear or pain perception? | | | | | |
| **What I searched?** | **Conditions or intrinsic factors** | | **Article:** | **Conclusions:** | |
| Intolerance of uncertainty theory | IU is a distress intolerance | | Freeston and Komes (2023). | Contrasting perspective with Carleton (2016)  IU is a distress intolerance  Somatic error theory of anxiety   * Examines uncertainty as a felt sense which arises from cognitive appraisal of an internal feeling. | |
| Citation searching from Carleton (2016) | Fear of the unknown | | Hong and Cheung (2014) | Meta-analytic review of 73 articles  Explored how six commonly reported cognitive vulnerabilities are associated with anxiety and depression.  All 6 had moderate – strong correlations  IU was most significant | |
| Citation searching from Carleton (2016) | IU: Theoretical and practice perspectives | | Carleton (2012) |  | |
| **Step 4: Identification of part of an idea:**   * Patients past medical history and presence of psychological conditions, neurodevelopmental conditions. * Also influenced by their degree of self-efficacy and pain perception. * Fear or intolerance on uncertainty – ongoing debate | | | | | |

**STEP 5: Expression of the theory and testing the model.**

**Q: Do you agree with the terms or labels?**

Pain perception and physiological symptoms: These two were merged as the model of ‘fluctuating uncertainty’ by Bourke et al (2022) was shaped by pain self-efficacy (perceived ability to cope) **and** pain perception.

‘Constructing an explanatory model’ (the diagnosis/understanding) was added as another key component, as per the model by Toye and Barker (2012).

**Version 1**

**Q: Should the process start with an unknown?**

There are several key elements (history of psychological disorders, fear of the unknown, physiological symptoms, interactions with the clinician and the examination +/- investigations) that can all be influenced by components that are unknown. Therefore, I envision ‘the unknown’ as encompassing all of these factors which then would then have an effect on how the individual regulates their emotions and subsequently tolerates uncertainty.

**Q: Should this move to the centre of the model as the clinician can influence / explore all of the other four components?**

**Outcome Perception of uncertainty about the future**

**A diagram of a diagram

Description automatically generatedSTEP 5: Model testing and modifications.**

**Q: Does the unknown factors lead to different responses? Can we remove the need for the second cycle?**

Yes -

See version 4a

**Version 2:**

Version 2’ did not demonstrate how the psychosocial factors could lead to the adaptive ERS or maladaptive ERS. Articles and further literature searching was undertaken to demonstrate how these different elements fit together.

***Q: Do the factors link together? If so how? What is the evidence for this?***

Interactions with the clinician was moved to the centre because during the consultation, they can obtain information around their pain perception, concerns/fears, history of emotional disorders etc. **They can influence all factors.**

They are also the most trusted/main source of information – (Darlow et al, 2013; Toye and Barker, 2012).

**Emotion regulation cycles.**

See next page.

**Arrows - Justification:** Although most of the time we have a positive influence/outcome (large arrow), sometimes we unfortunately can negatively impact patients’ perceptions (smaller line back to maladaptive emotion regulation strategies).***Literature:*** *Darlow et al (2013)*

**ARROWS / INTERACTIONS / RELATIONSHIPS:**

**Q: Do the arrows look right? If not, how should they look? How do the different elements fit together? Are the unidirectional? Or go both ways?   
  
Evidence to support this: the studies that support this?**

We manage maladaptive emotion regulation with these treatment interventions/approaches which are based on interactions with the clinician (again, situated at the centre). Those approaches are also based on the model of hope from Toye & Barker (2012).

**STEP 5: Model testing and modifications**

**Q: Does there appear to be adaptive and maladaptive responses from the studies and is there evidence from the studies of these two cycles? If it doesn’t always occur why or when does it not?**

**The previous/initial cycles:**

**People regulate their emotions in one of two ways:**

1) ADAPTIVE:  
 = TOLERATE uncertainty   
 = Increased hope   
 = Cognitively flexible.

2) MALADAPTIVE:  
 = INTOLERATE uncertainty   
 = Decreased hope   
 = Cognitively rigid.

Demirtas and Yildiz, 2019.  
Sahib et al, 2023.  
Vowles and McMracken, 2009.

**New emotion regulation cycles:**

**STEP 5: Model testing and modifications**

***Q: Do the factors link together? If so how? What is the evidence for this?***

This model incorporated how the factors of unknown can result in the utilisaiton of adaptive or maladaptive ERS, but it still doesn’t completely demonstrate how all the factors are interlinked.

Examination and diagnostic investigations (links with the clinician and pain perception) – patients need to understand the cause through accepting an explanatory model for pain.

**Version 3**

**A diagram of a patient's condition

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***Q: Is there a different way to present it?***

The main issue with this model is that it doesn’t show how ALL the ‘unknown’ factors are interlinked. See version 4a + 4b

***Q: Could there be one emotion regulation cycle?***

Emotion regulation   
= Tolerance of uncertainty,   
= Impact on hope  
= Ability to be psychologically flexible.

See version 4a + 4b

**STEP 5: Model testing and modifications**

A diagram of a diagram

Description automatically generated with medium confidenceA diagram of a medical procedure

Description automatically generated with medium confidence**Version 4a Version 4b**

**ALL are the factors are interlinked.**

**Amendment:**Condensed the emotion regulation cycle and added how they are correlated (Demirtas and Yildiz, 2019)

**STEP 5: Model testing and modifications**

**Q: Could a simplified process be presented so it can be understood via key stages?** See version 5

**Version 5**

**Amendment:** Added how they are correlated (Demirtas and Yildiz, 2019)

**Q. Are the -ve and +ve always the same within the regulation cycle?**

Demirtas & Yildiz (2019) – only one study that explores the relationship between hopelessness, cognitive flexibility, intolerance of uncertainty and perceived stress.

**\* Only one study - but the results were statistically significant**

A diagram of a diagram

Description automatically generated

**Q. Amendment: Added -ve and +ve correlation symbols for IU and emotion regulation cycle?**

**Sahib et al (2023)**   
**Well established correlations:**= +ve correlation between maladaptive strategies and intolerance of uncertainty  
= -ve correlations between adaptive strategies and intolerance of uncertainty

**Amendment:**

**What is the centre of the process? And do outcomes result from this?**

The heart of the process is the emotion regulation cycle because how the individual is able to regulate their emotions influences how they manage/deal with the unknown / uncertain situations.

Broke down the emotion regulation cycle and added how they are correlated (Demirtas and Yildiz, 2019)

**STEP 5: Model testing and modifications**   
**Version 6:**

A diagram of a psychological regulation

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**Amendment - terminology:**

Fear of the unknown OR dislike of not knowing – ongoing debate

– see next page (Freeston and komes, 2023).

**Amendment**

See next page / further reading. As opposed to it being an ‘unknown’ component, it is rather a factor that predisposes the individual to IU and maladaptive ERS.

**STEP 5: Model testing and modifications**

**Version 7a:**

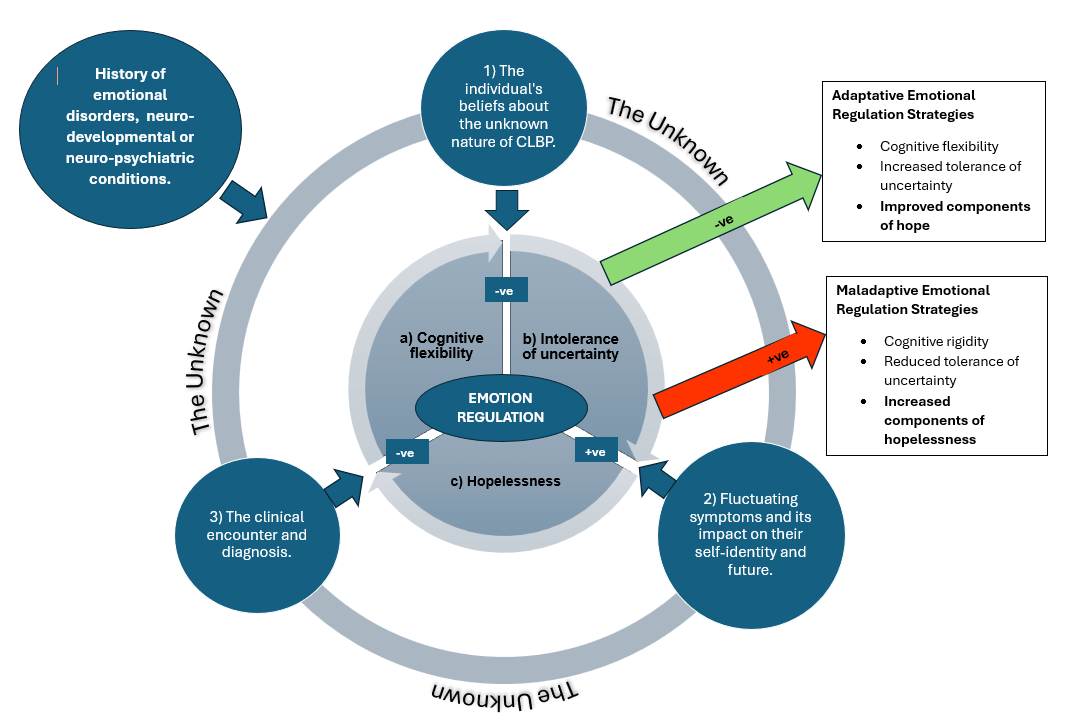
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* Final amendments to format, terminology and labels.

**STEP 6: Theoretical saturation**

**FINAL VERSION (7b)**

****