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Are weather conditions associated with chronic musculoskeletal pain? A review of methodology

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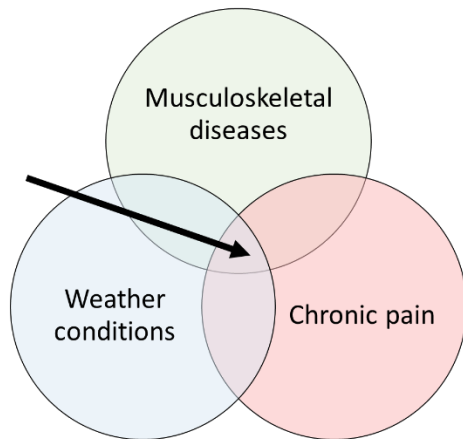
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This Supplementary Material contains information on:

- The search strategy
- Study characteristics used for Figure 1

## Search Strategy



Supplementary Figure 1: Venn diagram visualising the scope of this narrative review

This review is aimed at providing an overview of the scientific literature on the association between weather conditions and chronic musculoskeletal pain (see Supplementary Figure 1). The scope of the review was limited to original articles in the English language describing observational studies in humans.

To cover the literature as widely as possible, we searched 5 databases of scientific literature:

- MEDLINE
- EMBASE
- Web of Science
- Scopus
- PsycINFO

The search strategies for these databases each contained keywords for:

1. Weather conditions
2. Musculoskeletal diseases
3. Chronic pain
4. Filters to exclude articles that were not:
  - Observational
  - Conducted in humans
  - Reporting original research

We experimented with validated search filters for observational studies only, but when adding these, relevant observational studies that did not specifically declare their study design in the title or abstract were excluded; hence, we did not apply this filter.

MEDLINE and EMBASE have indexed all articles using a thesaurus (Medical Subject Headings in MEDLINE; Emtree in EMBASE) arranged in a hierarchy of headings. High-level headings automatically include more specific terms (e.g. searching on *arthritis* automatically includes the terms *osteoarthritis*, *spondyloarthritis* and *gout* as well). Web of Science, Scopus and PsycINFO only allow for free-text search and do not have the thesaurus functionality. Hence, there are minor differences in search strategy because the same search strategy had to be recreated using free-text search terms in these latter three databases.

### Search terms of the five databases

All searches were done from the earliest available date to 30 August 2019. Below are the search strategies for each database.

MEDINFO Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to August 30, 2019

- 1 exp Meteorological Concepts/ or weather.tw.  
exp Arthritis/ or exp Fibromyalgia/ or Arthritis.tw. or Fibromyalgia.tw. or Gout.tw. or Osteoarthritis.tw. or Spondyloarthritis.tw.
- 2 Spondyloarthritis.tw.
- 3 exp Pain/ or pain.tw.
- 4 exp Musculoskeletal Pain/
- 5 1 and ((2 and 3) or 4)
- 6 exp animals/ not humans.sh.
- 7 exp letter/ or exp historical article/ or Editorial.pt. or comment.pt.
- 8 5 not (6 or 7)

#### EMBASE

- 1 exp Meteorological phenomena/ or weather.tw. or exp Meteorology/  
exp Arthritis/ or exp Fibromyalgia/ or arthritis.tw. or fibromyalgia.tw. or Gout.tw. or Osteoarthritis.tw. or Spondyloarthritis.tw.
- 2 Spondyloarthritis.tw.
- 3 exp Pain/ or pain.tw.
- 4 exp Musculoskeletal Pain/
- 5 1 and ((2 and 3) or 4)
- 6 animals/ or nonhuman/ or animal experiment/
- 7 letter/ or editorial.pt.
- 8 5 not (6 or 7)

#### PSYCINFO

- 1 exp Atmospheric Conditions/ or weather.tw.  
exp Arthritis/ or exp Fibromyalgia/ or arthritis.tw. or fibromyalgia.tw. or Gout.tw. or Osteoarthritis.tw. or Spondyloarthritis.tw.
- 2 Spondyloarthritis.tw.
- 3 exp Pain/ or pain.tw.
- 4 musculoskeletal pain.tw.
- 5 1 and ((2 and 3) or 4)
- 6 exp animals/ not humans.sh.
- 7 exp letter/ or Editorial.pt. or comment.pt.
- 8 5 not (6 or 7)

#### WEB OF

SCIENCE Databases= WOS, BCI, CCC, DRCI, DIIDW, KJD, MEDLINE, RSCI, SCIELO, ZOOREC

- 1 TS=(weather OR \*meteorol\*)
- 2 TS=(arthritis OR fibromyalgia OR gout OR osteoarthritis OR spondyloarthritis)
- 3 TS=(pain)
- 4 #1 AND #2 AND #3
- 5 #4 NOT (#5 or #6)
- 6 TS=(animals NOT humans)
- 7 #5 NOT #6

#### SCOPUS

- 1 TITLE-ABS-KEY(weather OR \*meteor\*) AND DOCTYPE(ar)  
TITLE-ABS-KEY(arthritis OR fibromyalgia OR gout OR osteoarthritis OR spondyloarthritis) AND
- 2 DOCTYPE(ar)
- 3 TITLE-ABS-KEY(pain) AND DOCTYPE(ar)
- 4 #1 AND #2 AND #3

## Study characteristics used for Figure 2

Supplementary Table 1: Study characteristics used for Figure 2

	Participants (N)	Duration of outcome data collection (days)	Study design	Study span longer than duration of outcome data collection?	Did all participants participate for length of study?	Study span
Abasolo et al., 2013	245	4	Case-crossover (Retrospective)	NO	YES	NA
Aikman et al, 1997	25	122	Cohort (Prospective)	YES	YES	4 x 1 month [during span of 1 year]
Arber et al., 1994	82	1	Cross-sectional (Retrospective)	NO	YES	NA
Beilken et al., 2015	981	3	Case-crossover (Retrospective)	NO	YES	NA
Bossema et al., 2012	333	28	Cohort (Prospective)	NO	YES	NA
Brennan et al., 2012	53	28	Cohort (Prospective)	NO	YES	NA
Cay et al, 2011	56	244	Cohort (Prospective)	YES	YES	NA
De Blecourt et al., 1993	32	32	Cohort (Prospective)	YES	YES	monthly [during span of 6 months]
Dequeker et al., 1986	19	15	Cohort (Prospective)	NO	No (see next column)	up to 92 days
Dorleijn et al. 2014	222	8	Cohort (Prospective)	YES	YES	3-monthly [during span of 2 years]
Drane et al., 1997	53	64	Cohort (Prospective)	YES	No (see next column)	14 days x 3 monthly periods [during span of, depending on participant, 1-3 years]
Duong et al., 2016	1604	14	Cohort (Prospective)	NO	YES	NA
Ferreira et al., 2016	171	5	Case-crossover (Prospective)	NO	YES	NA
Fagerlund et al., 2019	48	30	Cohort (prospective)	NO	YES	NA
Fors et al., 2002	55	28	Cohort (Prospective)	NO	YES	NA
Glaser et al., 2004	2687 7	1	Cross-sectional (Retrospective)	NO	YES	NA
Gorin et al., 1999	75	75	Cohort (Prospective)	NO	YES	NA
Guedj et al., 1990	64	28	Cohort (Prospective)	NO	YES	NA
Hagglund et al., 1994	84	NR	Cohort (Prospective)	NO	YES	NA
Isik et al., 2013	2999 6	1	Cross-sectional (Retrospective)	NO	YES	NA
Jena et al., 2017	1552 842	1	Cross-sectional (Retrospective)	NO	YES	NA
Koyama et al., 1996	18	24	Cohort (Prospective)	NO	YES	NA

Laborde et al., 1986	161	2	Cohort (Prospective)	YES	YES	14 days
MacFarlane et al., 2009	381	1	Cross-sectional (Prospective)	NO	YES	NA
McAlindon et al., 2007	200	7	Cohort (Retrospective)	YES	YES	90 days
McGorry et al., 1998	94	182	Cohort (Retrospective)	NO	YES	NA
Neogi et al., 2014	619	5	Case-crossover (Retrospective)	NO	YES	NA
Patberg et al., 1985	88	365	Cohort (Prospective)	NO	YES	NA
Peultier et al., 2017	113	1	Cross-sectional (Prospective)	NO	YES	NA
Queiroga et al., 2013	32	24	Cohort (Prospective)	YES	YES	61 days
Redelmeier et al., 1996	18	30	Cohort (Prospective)	YES	YES	485 days
Rentschler et al., 1929	367	197	Cohort (Prospective)	NO	No (see next column)	NA
Savage et al., 2014	133	5	Cohort (Prospective)	YES	YES	2 years
Sibley et al., 1985	70	31	Cohort (Prospective)	NO	YES	NA
Smedslund et al., 2009	36	84	Cohort (Prospective)	YES	YES	107 days
Smedslund et al., 2014	50	35	Cohort (Prospective)	NO	YES	NA
Steffens et al., 2014	993	3	Case-crossover (Retrospective)	NO	YES	NA
Strusberg, 2017	183	365	Cohort (Prospective)	NO	YES	NA
Timmermans et al., 2015	810	42	Cohort (Prospective)	YES	YES	548 days
Tsai et al., 2005	29	61	Cohort (prospective)	NO	No	21 participants for 120 days; 8 participants for 60 days
Verges et al., 2004	134	31	Cohort (Prospective)	NO	YES	NA
Viitanen et al., 1995	39	7	Cohort (Prospective)	NO	No (see next column)	5, 7 and 9 days
Wilder et al., 2003	154	40	Cohort (Prospective)	YES	YES	1278 days