

## Smartphone study shows pain more likely on humid, windy days

October 24 2019, by Follow Me On Twitter(Opens In New Window)Add Me On Linkedin(Opens In New Window) Jordan Kenny



The Cloudy app. Credit: University of Manchester

People with long-term health conditions are 20 percent more likely to suffer from pain on days that are humid and windy with low atmospheric



pressure according to new research from University of Manchester scientists.

The study, funded by Versus Arthritis, was based on the experience of people with conditions such as arthritis, fibromyalgia, migraine and <u>neuropathic pain</u> from across the UK.

According to the research, the most important factor associated with worsening pain is high relative humidity.

The study, called "Cloudy with a Chance of Pain," ran throughout 2016 and recruited over 13,000 people from all 124 postcode areas of the UK, from Orkney to the Isles of Scilly.

Using a <u>smartphone app</u> developed by healthcare software company uMotif, participants recorded daily symptoms while the <u>local weather</u> was determined from location data provided by the smartphone's GPS.

This analysis looked at data from 2,658 people who provided daily data on most days for around six months. The participants had a range of different health issues, predominantly arthritis.

Humid days were most likely to be painful, whereas dry days were least likely to be painful. Low pressure and higher wind speed were also linked to more painful days, although to a lesser extent than humidity.

Despite many people believing pain to be influenced by temperature, there was no association observed, when averaged across the population. That said, cold days that were also damp and windy could be more painful. Rainfall was not associated with pain.

Although the weather is known to influence mood, and mood can influence pain, this pathway did not explain the findings. Even when



accounting for mood, the weather-pain association persisted.

Professor Will Dixon, Centre for Epidemiology Versus Arthritis at the University of Manchester, led the study.

He said, "Weather has been thought to affect symptoms in patients with arthritis since Hippocrates. Around three quarters of people living with arthritis believe their pain is affected by the weather.

Yet despite much research examining the existence and nature of this relationship, there remains no scientific consensus. We hoped that smartphones would allow us to make greater progress by recruiting many more people, and tracking daily symptoms across seasons.

"The analysis showed that on a damp and windy days with low pressure the chances of experiencing more pain, compared to an average day, was around 20 percent. This would mean that, if your chances of a painful day on an average weather day were five in 100, they would increase to six in 100 on a damp and windy day.

"The results of this study could be important for patients in the future for two reasons. Given we can forecast the weather, it may be possible to develop a pain forecast knowing the relationship between weather and pain. This would allow people who suffer from <u>chronic pain</u> to plan their activities, completing harder tasks on days predicted to have lower levels of pain. The dataset will also provide information to scientists interested in understanding the mechanisms of pain, which could ultimately open the door to new treatments."

Carolyn Gamble who has a form of arthritis called ankylosing spondylitis said: "So many people live with chronic pain, affecting their work, family life and their mental health. Even when we've followed the best pain management advice, we often still experience daily pain.



Having taken part in the study, she adds, "knowing how the <u>weather</u> impacts on our pain can enable us to accept that the pain is out of our control, it is not something we have done, or could have done differently in our own self-management."

Dr. Stephen Simpson, director of research at Versus Arthritis, said: "We know that of the 10 million people in the UK with arthritis, over half experience life-altering pain every day. But our healthcare system is simply not geared up to effectively help people with arthritis with their number one concern.

"Supporting effective ways of self-managing pain can make all the difference for people with arthritis, helping them to get and stay in work, to be full members of the community and simply to belong.

"Will Dixon and his team and their collaborators have shown a remarkable spirit of innovation, pushing new boundaries to bring people with arthritis into research. This research will help us understand the bigger picture of the complexity of <u>pain</u> caused by <u>arthritis</u> and how people with the condition can take control of it."

**More information:** William G. Dixon et al. How the weather affects the pain of citizen scientists using a smartphone app, *npj Digital Medicine* (2019). DOI: 10.1038/s41746-019-0180-3

## Provided by University of Manchester

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