Study shows mindfulness meditation reduces pain more effectively than placebo

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Scientists at Wake Forest Baptist Medical Center have found new evidence that mindfulness meditation reduces pain more effectively than placebo.

This is significant because placebo-controlled trials are the recognized standard for demonstrating the efficacy of clinical and pharmacological treatments.

The research, published in the Nov.11 issue of the *Journal of Neuroscience*, showed that study participants who practiced mindfulness meditation reported greater pain relief than placebo. Significantly, brain scans showed that mindfulness meditation produced very different patterns of activity than those produced by placebo to reduce pain.

"We were completely surprised by the findings," said Fadel Zeidan, Ph.D., assistant professor of neurobiology and anatomy at Wake Forest Baptist and lead investigator of the study. "While we thought that there would be some overlap in brain regions between meditation and placebo, the findings from this study provide novel and objective evidence that mindfulness meditation reduces pain in a unique fashion."

The study used a two-pronged approach - pain ratings and brain imaging - to determine whether mindfulness meditation is merely a placebo effect. Seventy-five healthy, pain-free participants were randomly assigned to one of four groups: mindfulness meditation, placebo meditation ("sham" meditation), placebo analgesic cream (petroleum jelly) or control.

Pain was induced by using a thermal probe to heat a small area of the participants' skin to 49 degrees Centigrade (120.2 degrees Fahrenheit), a level of heat most people find very painful. Study participants then rated pain intensity (physical sensation) and pain unpleasantness (emotional response). The participants' brains were scanned with arterial spin labeling magnetic resonance imaging (ASL MRI) before and after their respective four-day group interventions.

The mindfulness meditation group reported that pain intensity was reduced by 27 percent and by 44 percent for the emotional aspect of pain. In contrast, the placebo cream reduced the sensation of pain by 11 percent and emotional aspect of pain by 13 percent.

"The MRI scans showed for the first time that mindfulness meditation produced patterns of brain activity that are different than those produced by the placebo cream," Zeidan said.

Mindfulness meditation reduced pain by activating brain regions (orbitofrontal and anterior cingulate cortex) associated with the self-control of pain while the placebo cream lowered pain by reducing brain activity in pain-processing areas (secondary somatosensory cortex).

Another brain region, the thalamus, was deactivated during mindfulness meditation, but was activated during all other conditions. This brain region serves as a gateway that determines if sensory information is allowed to reach higher brain centers. By deactivating this area, mindfulness meditation may have caused signals about pain to simply fade away, Zeidan said.

Mindfulness meditation also was significantly better at reducing pain intensity and pain unpleasantness than the placebo meditation. The placebo-meditation group had relatively small decreases in pain intensity (9 percent) and pain unpleasantness (24 percent). The study findings suggest that placebo meditation may have reduced pain through a relaxation effect that was associated with slower breathing.

"This study is the first to show that mindfulness meditation is mechanistically distinct and produces pain relief above and beyond the analgesic effects seen with either placebo cream or sham meditation," Zeidan said.

"Based on our findings, we believe that as little as four 20-minute daily sessions of mindfulness meditation could enhance pain treatment in a clinical setting. However, given that the present study examined healthy, pain-free volunteers, we cannot generalize our findings to chronic pain patients at this time."

Source:
Wake Forest Baptist Medical Center