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Commentary

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Pain is known to have many aversive effects not only on our physical, emotional, and social well-being but also on behavioral outcomes, such as adherence to treatments. For example, participants who perceive Pap tests as painful are more likely to be nonadherent to the screening schedule,[3] suggesting that pain-related fear and previous experiences play a pivotal role. However, diagnostic procedures are usually not studied regarding these possible unwanted consequences that might result in lower adherence and lack of willingness to undergo these types of procedures in the future.

In the trial by Yen et al.,[10] reported in this issue, it was investigated whether adding a nonpainful step at the end of Pap tests helps women recall less pain. In this study, 266 women who were coming in for a Pap test were randomized to either the standard Pap test or a modified pap test. Results were generally in line with the hypotheses and suggested that including a nonpainful event at the end of the procedure led to less pain recalled 5-minutes later. Furthermore, the intervention led to less recalled pain 1 year later and increased willingness to receive further Pap test. The authors explain these results mainly by the peak-and-end rule, which suggests that memory of a painful medical treatment is likely to be less aversive if relief from the pain is gradual than if relief is abrupt. For example, it has been shown that the peak-and-end rule might be responsible for experience of more dyspnea in healthy participants.[2] Similarly, providing relief in the context in which pain has been experienced has been supposed to provide a more favorable memory than immediate transition to a new context when the pain ends.[4] In addition to the peak and end effects, exposure to one stimulus is also known to influence a response to a subsequent stimulus, and these priming effects (eg, first and last experience in a sequence) produce strong effects of the participant's pain memory.[6] Also, diagnostic procedures might produce nocebo effects as adverse treatment outcomes that cannot be ascribed to active treatments ingredients.[1,9] Nocebo effects are usually a result of expectancy learning mechanisms, such as a combination of verbal suggestions and previous experiences by conditioning and can significantly lead to reduced treatment efficacy. Next to previous experiences and conditioning, the wording used before and during painful medical procedures have been shown to significantly affect the painfulness and discomfort of the procedures.[8]

Research into these mechanisms of unwanted effects of painful or aversive diagnostic tests is of utmost importance. Particular attention should be paid in the future for possible moderator effects and individual differences of participants who might be most sensitive for these effects. Although postmenopausal women responded slightly better to the adjusted procedure in the current trial, no additional predictors could be identified in their explorative moderator analyses. Other research previously showed that pain-related fear was a significant predictor of nocebo hyperalgesia.[7] Similarly, in a systematic review by Kern et al.,[5] it was found that higher anxiety was associated with increased nocebo responses. Therefore, patients who might be more prone to experience fear of discomfort or pain of medical treatments might be more susceptive for nocebo effects. It can be valuable to identify those individuals who are more sensitive to induction and generalization of nocebo effects and consequently increased pain experiences. Finding methods to reduce possible nocebo effects and identify possible predictors (especially fear of discomfort or pain) could be of significant added value for diagnostic procedures like Pap test. Future research should aim at investigating these mechanisms and could indicate for which specific patient group these adjusted diagnostic procedures would be most beneficial.

Conflict of interest statement

The author has no conflict of interest to declare.

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