Joyful music may promote heart health

November 11 2008

Listening to your favorite music may be good for your cardiovascular system. Researchers at the University of Maryland School of Medicine in Baltimore have shown for the first time that the emotions aroused by joyful music have a healthy effect on blood vessel function.

Music, selected by study participants because it made them feel good and brought them a sense of joy, caused tissue in the inner lining of blood vessels to dilate (or expand) in order to increase blood flow. This healthy response matches what the same researchers found in a 2005 study of laughter. On the other hand, when study volunteers listened to music they perceived as stressful, their blood vessels narrowed, producing a potentially unhealthy response that reduces blood flow.

The results of the study, conducted at the University of Maryland Medical Center, will be presented at the Scientific Sessions of the American Heart Association, on November 11, 2008, in New Orleans.

"We had previously demonstrated that positive emotions, such as laughter, were good for vascular health. So, a logical question was whether other emotions, such as those evoked by music, have a similar effect," says principal investigator Michael Miller, M.D., director of preventive cardiology at the University of Maryland Medical Center and associate professor of medicine at the University of Maryland School of Medicine. "We knew that individual people would react differently to different types of music, so in this study, we enabled participants to select music based upon their likes and dislikes."

Study design

Ten healthy, non-smoking volunteers (70 percent male, average age 36 years) participated in all phases of the randomized study. There were four phases. In one, volunteers listened to music they selected that evoked joy. The volunteers brought recordings of their favorite music to the laboratory, or, if they did not own the music, the investigators acquired the recordings. Another phase included listening to a type of music that the volunteers said made them feel anxious. In a third session, audio tapes to promote relaxation were played and in a fourth, participants were shown videotapes designed to induce laughter.

Each volunteer participated in each of the four phases, but the order in which each phase occurred was determined at random.

To minimize emotional desensitization, the volunteers were told to avoid listening to their favorite music for a minimum of two weeks. "The idea here was that when they listened to this music that they really enjoyed, they would get an extra boost of whatever emotion was being generated," says Dr. Miller.

Prior to each phase of the study, the volunteers fasted overnight and were given a baseline test to measure what is known as flow-mediated dilation.

This test can be used to determine how the endothelium (the lining of blood vessels) responds to a wide range of stimuli, from exercise to emotions to medications. The endothelium has a powerful effect on blood vessel tone and regulates blood flow, adjusts coagulation and blood thickening, and secretes chemicals and other substances in response to wounds, infections or irritation. It also plays an important role in the development of cardiovascular disease.

During the blood vessel dilation test, blood flow in the brachial artery, located in the upper arm, is restricted by a blood pressure cuff and released. An ultrasound device measures how well the blood vessel responds to the sudden increase in flow, with the result expressed as a percentage change in vessel diameter.

After the baseline test, each volunteer was exposed to the music or humorous video for 30 minutes. Additional dilation measurements were obtained throughout each phase to assess changes from baseline. Participants returned a minimum of one week later for the next phase. Sixteen measurements per person or a total of 160 dilation measurements were taken during the course of the study, which took six to eight months to complete.

Study results

Compared to baseline, the average upper arm blood vessel diameter increased 26 percent after the joyful music phase, while listening to music that caused anxiety narrowed blood vessels by six percent. "I was impressed with the highly significant differences both before and after listening to joyful music as well as between joyful and anxious music," says Dr. Miller.

During the laughter phase of the study, a 19 percent increase in dilation showed a significant trend. The relaxation phase increased dilation by 11 percent on average; a number that the investigators determined was not statistically significant.

Most of the participants in the study selected country music as their favorite to evoke joy, according to Dr. Miller, while they said "heavy metal" music made them feel anxious. "You can't read into this too much, although you could argue that country music is light, spirited, a lot of love songs." says Dr. Miller, who enjoys rock, classical, jazz and

country music. He says he could have selected 10 other individuals and the favorite could have been a different type of music.

Could other types of music produce similar positive effects on blood vessels? It's possible, according to Dr. Miller. "The answer, in my opinion, is how an individual is 'wired.' We're all wired differently, we all react differently. I enjoy country music, so I could appreciate why country music could cause that joyful response," he says.

Dr. Miller believes that a physiological reaction to the type of music is behind the formation of positive and negative blood vessel reaction. "We don't understand why somebody may be drawn to certain classical music, for example. There are no words in that, and yet the rhythm, the melody and harmony, may all play a role in the emotional and cardiovascular response."

That physiological impact may also affect the activity of brain chemicals called endorphins. "The emotional component may be an endorphin-mediated effect," says Dr. Miller. "The active listening to music evokes such raw positive emotions likely in part due to the release of endorphins, part of that mind-heart connection that we yearn to learn so much more about. Needless to say, these results were music to my ears because they signal another preventive strategy that we may incorporate in our daily lives to promote heart health."

Source: University of Maryland