Screening young athletes to prevent sudden cardiac arrest not proven to save lives

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Young athletes should not undergo screening to prevent sudden cardiac arrest because it is not proven to save lives, suggests an analysis of the available evidence published in *The BMJ* today.

The findings show that the harms outweigh any benefits, and no robust evidence exists to confirm it actually prevents deaths.

"Sudden cardiac death of a young person on a sports field is a devastating event," explain the authors from the Belgian Health Care Knowledge Centre.

They estimate that around 0.001% of young athletes die suddenly from sudden cardiac arrest every year, often caused by an underlying cardiovascular condition.

Pre-participation screening is an attempt to identify these conditions, and prevent deaths. But there are disagreements about the harms and benefits, and national guidelines make different recommendations on types of screening.

So the authors carried out a detailed review of the literature on the harms and benefits of such pre-participation screening programmes to prevent cardiac arrest in non-professional athletes aged 18-34 years.

The American Heart Association recommends taking a personal and family history along with a physical examination. But very few people at

risk of sudden cardiac death are detected this way.

Only 4 out of 115 young athletes who died suddenly had a standard pre-participation evaluation, and the condition that led to death was identified in only one athlete.

The European Society of Cardiology also recommends an electrocardiogram (ECG), a test that checks for problems with the electrical activity of the heart.

While ECGs can be better at detecting certain conditions, these don't pick up all signs and symptoms associated with cardiac disease, and the sensitivity of this test is generally low.

Overall, 25% of people with a condition that may lead to a sudden cardiac death would not be identified, say the authors.

At the same time, there are a high number of false positives associated with screening programmes, meaning healthy people are inappropriately identified as having a potential condition, leading to overdiagnosis and overtreatment.

Up to 5% of healthy people can be suspected of having disease following ECGs, and up to 30% of those screened may be referred for additional cardiovascular testing.

These additional tests can lead to unnecessary harms associated with anxiety and psychological trauma, overdiagnosis and overtreatment. And athletes can be subjected to temporary or lifelong restrictions and exclusion from sport, and impediments to insurability or employment opportunities.

Doctors also don't agree on standard treatments for the conditions

identified. Most people with commonly identified conditions will lead normal lives with no symptoms, and the risk of death associated with some treatments for these diseases is similar to that of sudden cardiac death.

"As long as those at high risk of sudden death cannot be reliably identified and appropriately managed, young athletes should not be submitted to pre-participation screening," conclude the authors.

The only piece of evidence that suggests screening saves lives comes from the Veneto study, by Italian researchers, that shows a 90% reduction of deaths in the region following mandatory screening in 1976.

The Italian investigators have played an important role in the introduction of pre-participation screening, but critics say their findings do not prove lives were saved because of the study's limitations.

"Some of the concerns might be clarified if the Italian investigators provide access to additional unpublished data," say the Belgian authors, who have made repeated requests to the investigators directly, and through the UK and Italian health ministers.

The BMJ contacted professor Domenico Corrado, a lead author of some of the Italian studies. He did not answer whether he had been approached by the government for more data.

But, in response to the authors, he said they "were analyzing new data on sport-related mortality in the Veneto region of Italy during the last decade and that updated data were not available for public release yet".

He repeated that the "the long-running Italian experience with universal pre-participation screening shows that systematic ECG screening of young competitive athletes... is life-saving."

In a linked editorial, Christopher Semsarian from the University of Sydney says this latest analysis "brings into sharp focus the uncertainties surrounding the effectiveness of pre-participation screening."

More research is needed to "fill in the many gaps and take us nearer to the ultimate goal of preventing rare but tragic sudden deaths in young people," he says. But this will be costly and take a long time because the condition is rare.

Other solutions include developing better screening tools to limit overdiagnosis as well as improving education and raising awareness among athletes and health professionals.

Coaches and players should be trained in pulmonary resuscitation, and defibrillators should be available at all sporting venues to improve chances of survival after a cardiac arrest, he adds.

More information: Hans Van Brabandt et al. Harms and benefits of screening young people to prevent sudden cardiac death, *BMJ* (2016). DOI: 10.1136/bmj.i1156

Deborah Cohen. Data on benefits of screening for sudden cardiac death are withheld, *BMJ* (2016). DOI: 10.1136/bmj.i2208

Christopher Semsarian et al. Preventing sudden cardiac death in athletes, *BMJ* (2016). DOI: 10.1136/bmj.i1270

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