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THE NEUROBEHAVIORAL EFFECTS OF EXERCISE ON MEMORY FUNCTION DURING PREGNANCY

GEBELİK SIRASINDA BELLEK İŞLEVİNDE EGZERSİZİN NÖRODAVRANIŞSAL ETKİLERİ

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Abstract

Memory function is essential for optimal daily functioning. Emerging work demonstrates that memory function may be compromised during pregnancy. Encouragingly, exercise engagement may subserve memory function among various populations; however, limited research has evaluated whether exercise can attenuate memory impairment during pregnancy. This letter addresses this issue. Albeit limited, there is some research suggesting that exercise may alleviate this pregnancy-induced memory impairment, with mechanisms discussed herein. Future work in this under-investigated area is needed.

Keywords: episodic; maternal; neurotrophin; physical activity

Özet

Bellek işlevi, günlük işlerde verimli çalışmanız için gereklidir. Yapılan çalışmalar hamilelik sırasında bellek işlevinin tehlikeye girebileceğini göstermektedir. Buna rağmen egzersizler çeşitli popülasyonlar arasında bellek işlevlerini koruyabilir; ancak sınırlı sayıda araştırma, hamilelik sırasındaki egzersizin bellek kaybını azaltıp azaltamayacağını değerlendirmiştir. Makalemiz bu konuyu ele almaktadır. Sınırlı da olsa egzersizin gebeliğe bağlı bellek bozulmasını, bu makale kapsamında tartışılan mekanizmalarla hafifletebileceğini öne süren bazı araştırmalar bulunmaktadır. Araştırılan bu alanda daha çok sayıda çalışmalara ihtiyaç vardır.

Anahtar Kelimeler: episodik; annesel; nörotrofin; fiziksel aktivite

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Dear Editor,

Pregnancy is associated with memory impairment (Henry & Rendell, 2007). This impairment is most common for memory tasks that require higher-order executive control processes (Anderson & Rutherford, 2012) and is more prevalent during the later stages of pregnancy (Galea et al., 2000).

Encouragingly, exercise has been shown to enhance memory function among the general population (Frith, Sng, & Loprinzi, 2017; Loprinzi, Edwards, & Frith, 2017; Loprinzi, Ponce, & Frith, 2018) and improve cognition-related cardiovascular disease risk factors among pregnant women (Loprinzi, Fitzgerald, Woekel, & Cardinal, 2013). Previous work demonstrates that maternal exercise can enhance memory function among their offspring (Robinson & Bucci, 2012). Mechanisms of this effect include exercise-induced neurogenesis, neurotrophic factor production, and neuronal activity in the offspring (Robinson & Bucci, 2012). What is lacking in the literature is a discussion as to whether maternal exercise can influence maternal memory function, and in particular, attenuate pregnancy-induced memory impairment. I address this specific question in this letter.

I identified studies using several electronic databases, including PubMed, PsychInfo, Sports Discus and Google Scholar. Articles were retrieved up to December 24, 2018 (no restriction was placed on how far back the study was published). The search terms, including their combinations, were: exercise, physical activity, cardiorespiratory fitness, memory, cognition, cognitive function, pregnant, pregnancy, and maternal. To be eligible for inclusion in this review, studies had to be published in English; employ a cross-sectional, prospective or experimental design; include a measure of exercise as the independent variable, with the exercise assessment occurring at some point duration gestation; and the outcome variable had to include a measure of memory function. Studies were not included if the memory outcome was evaluated in the mother's offspring or if the exercise bout was imposed to induce high levels of stress (Jafari, Mehla, Afrashteh, Kolb, & Mohajerani, 2017). To provide a comprehensive assessment on this topic, human and animal studies were eligible.

The computerized searches identified 1323 articles. From these, 1 article met the study inclusion criteria. This article, published by Kim et al. (2012), demonstrated that pregnancy impaired memory function in rats, while swimming during pregnancy alleviated this memory impairment. Pregnancy decreased cell proliferation in the dentate gyrus of the hippocampus, while exercise during pregnancy attenuated this effect.

This letter has two important highlights. First, there is a paucity of research evaluating the effects of maternal exercise on maternal memory function. Thus, this is an area in urgent need of experimental investigation. Second, at the present moment, it appears that maternal exercise may subserve maternal memory via hippocampal

neurogenesis. I hope this letter spawns the development of additional research in this under-investigated topic.

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