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**The intergenerational effects of parental physical activity on offspring brain and cognitive development: a scoping review**S. Valkenborghs<sup>a</sup>, P. Dent<sup>a</sup>, C. Stillman<sup>b</sup><sup>a</sup>The University of Newcastle, Australia<sup>b</sup>University of Pittsburgh, United States of America

**Introduction:** Maternal preconception and prenatal health behaviours (e.g., diet, alcohol consumption, smoking, etc.) impact offspring neurodevelopment. Physical activity (PA) has been linked to improved maternal health during preconception, pregnancy, and postpartum and reduced risk of pregnancy complications. PA not only helps to improve physical health but can also enhance brain health and cognition across the lifespan. Accumulating evidence in animal models suggests PA also has intergenerational effects on brain health and development. That is, parental PA levels—both preconception and during pregnancy—can affect offspring brain health. The extent of evidence of these effects in humans is unknown. This scoping review aimed to compile the human literature, identify knowledge gaps, and make recommendations for future human research in this area.

**Methods:** We conducted a systematic literature search of PubMed, MEDLINE, Embase, Cochrane Central, and PsycINFO for studies conducted in humans and published in English from database inception to 9th December 2021. Experimental or observational studies were included that reported data on parental PA exposure preconception (fathers and mothers) or prenatally (mothers only) in addition to data on offspring brain and cognitive development. Two reviewers independently screened studies for inclusion according to predetermined criteria. Data from included studies were extracted by one reviewer and verified by a second, including study characteristics, parental characteristics, offspring characteristics, parental PA exposure, offspring neurocognition, and key findings.

**Results:** Fourteen articles were included reporting results from six experimental (sample size  $n=18-336$ ) and eight observational (sample size  $n=65-74,971$ ) studies. All (100%) studies reported on maternal characteristics, whereas only one (7%) study reported on paternal characteristics (but not PA). Maternal PA exposure was prenatal only in 11 (79%) studies (100% of experimental studies and 63% of observational studies), while preconception and prenatal PA exposure was reported in three (21%) studies (38% of observational studies). Outcomes of offspring brain and cognitive development included brain activity (electroencephalography), neurodevelopment, communication, behaviour, verbal IQ, academic performance, and intelligence. Offspring follow-up was during the neonatal stage ( $n=2$ , 14%), infant stage (1-2y) ( $n=7$ , 50%), early childhood (4-7y) ( $n=3$ , 21%), late childhood (8-10y) ( $n=2$ , 14%), and young adulthood (17-21y) ( $n=1$ , 7%). Maternal PA exposure was positively related to offspring brain and cognitive development as neonates (2/2 studies) and infants (5/7 studies).

**Discussion:** Despite extensive evidence from animal models, little is known about the intergenerational effects of parental PA on offspring brain and cognitive development in humans, particularly paternal preconception PA. Emerging evidence is promising but more experimental and large prospective observational studies with offspring follow-up into late adolescence and young adulthood are needed. More objective and/or mechanistic assessments (e.g., event-related potentials, magnetic resonance imaging, neurotrophins, etc.) are also required as most existing evidence is based on subjective measures.

**Impact and application to the field:** While substantial literature from animal models indicates the benefits of PA on brain health and cognition can be intergenerational, evidence of such effects in humans is scant.

**Conflict of interest statement:** My co-authors and I acknowledge that we have no conflict of interest of relevance to the submission of this abstract.

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**Parental influences on physical activity and sport participation amongst adolescent girls from Culturally and Linguistically Diverse backgrounds**N. Dennaoui<sup>a</sup>, G. Kolt<sup>b</sup>, J. Guagliano<sup>b</sup>, E. George<sup>a</sup><sup>a</sup>School of Health Sciences, Western Sydney University, Australia<sup>b</sup>School of Health Sciences, Western Sydney University, Australia

**Introduction:** Despite known health and social benefits associated with regular physical activity (PA), participation rates in PA and sport decline rapidly during adolescence, particularly for girls. Some literature suggests there are steeper declines in PA and sport participation among those from Culturally and Linguistically Diverse (CALD) backgrounds, particularly those of Middle Eastern backgrounds. Parents can play an important role in influencing PA and sport participation of adolescent girls (e.g., positive role modelling). However, limited research has been conducted on the influence that parents from Middle Eastern backgrounds have on their daughters' PA and sport participation.

**Methods:** A total of 18 adolescent daughters (mean [ $\pm$ SD] age =  $15.5 \pm 0.7$  years) and 9 parents (7 mothers, 2 fathers;  $45.11 \pm 7.56$  years) of Middle Eastern background residing Greater Western Sydney were included in this qualitative study. Semi-structured focus groups ( $n = 5$ ) and individual interviews ( $n = 4$ ) were conducted to explore the perceptions and attitudes regarding PA and sport participation of parents and adolescent girls from Middle Eastern backgrounds, with references to culture, religion, and family. A thematic analysis, using an inductive approach, was used to analyse the data. Data analysis was conducted using Quirkos software.

**Results:** Participants reported barriers and facilitators to girls' PA and sport participation. A total of three main themes, family, social support, and religion and culture, and 14 subthemes emerged. The theme family encompassed the following subthemes, gender roles and expectations, education as a priority, family responsibilities, and family reputation and representation. The second theme, social support included was identified as both a barrier and facilitator to PA and sport participation. For example, family, peers, and schools were identified as positive influences on girls' PA engagement, yet girls also perceived family to be a barrier at times, along with technology and social media. The theme of religion and culture comprised subthemes of religion as a barrier, appearance and clothing, interactions with the opposite gender, religion as a motivator, and cultural expectations and representation. Many of the factors associated with religion and culture were perceived to be both barriers and facilitators PA and sport participation.

**Conclusion:** The current study explored the perceptions of parents and adolescent girls from a Middle Eastern background, on PA and sport participation. Family, social support, culture and religion were identified as the main factors that shape both parents and adolescent girls' attitudes and perceptions towards PA and sport participation.

**Impact/Application to the field:**

- This study can be used to inform culturally tailored PA interventions for adolescent girls and their parents.