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Introduction

Autism Spectrum Disorder (ASD) is a set of neurodevelopmental disorders, characterised by difficulties with social interactions and communication, as well as limited interests performed repetitively^{1,2}. Attention Deficit Hyperactivity Disorder (ADHD) is a chronic condition, characterised by persistent inattention, hyperactivity, and impulsivity^{1,3}.

Both younger and advanced maternal ages have been identified as potential risk factors for ASD⁴ and ADHD⁵ in the literature.



Source: <https://www.thehealthy.com/autism/autism-signs/>

Aim: To examine whether maternal age is associated with an increased risk of ASD or ADHD diagnosis in the offspring.

Methods

A retrospective analysis of the Millennium Cohort Study (MCS)⁶ was conducted. Data on maternal age at birth, and other confounders was extracted from the primary parental questionnaire which was carried out when the infants were 9 months old. Data on ASD and ADHD diagnosis was extracted from the fourth and sixth parental questionnaires carried out at age 7 and 14 respectively. Crude analysis, as well as adjusted logistic regression models, adjusting for parental ages, socioeconomic factors, maternal health, and perinatal factors, were used to analyse the relationship between maternal age and ASD or ADHD. A combined model, including factors shown to be most significant in previous models, was used for ASD (maternal smoking, hypertension, social deprivation, infant sex) and ADHD (smoking, hypertension, gestation age, infant sex, marital status of mother).

Results

There were 18,549 singleton mother-child pairs identified in sweep 1 of the MCS, with data on maternal age. The maternal ages were divided into categories with the following frequencies: 13-19 (8.6%), 20-24 (19.1%), 25-29 (27.6%), 30-34 (28.8%), 35-39 (13.6%) 40+ (2.2%). 13,256 mothers answered the question on ADHD, and 13,268 on ASD in sweep 4 of the study.

Table 1 The association between maternal age and the risk of ADHD, age 7

Maternal Age	Model A	Model B	Model C	Model D	Model E	Model F
13-19	1.19 (0.67-2.08)	0.89 (0.36-2.18)	0.62 (0.33-1.18)	0.98 (0.46-2.11)	1.24 (0.71-2.16)	0.78 (0.35-1.73)
20-24	0.96 (0.60-1.56)	0.88 (0.47-1.63)	0.80 (0.46-1.34)	0.73 (0.40-1.33)	1 (0.62-1.60)	0.70 (0.39-1.24)
25-29	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
30-34	0.35 (0.21-0.56)	0.38 (0.20-0.69)	0.37 (0.22-0.63)	0.44 (0.22-0.87)	0.35 (0.22-0.57)	0.43 (0.22-0.84)
35-39	0.32 (0.17-0.62)	0.40 (0.18-0.90)	0.37 (0.19-0.75)	0.40 (0.17-0.94)	0.32 (0.16-0.63)	0.38 (0.16-0.90)
40+	0.62 (0.18-2.17)	0.96 (0.27-3.4)	0.72 (0.20-2.54)	0.65 (0.10-4.27)	0.60 (0.17-2.16)	0.57 (0.08-4.06)

Model A (crude analysis); Model B (parental age): paternal age; Model C (socioeconomic/demographic): income, deprivation, marital status, ethnicity, maternal education; Model D (maternal health): smoking, BMI, hypertension in pregnancy, diabetes in pregnancy, alcohol consumption; Model E (perinatal): gestation, birthweight, sex, type of delivery; Model F (combined): smoking, hypertension in pregnancy, gestation, sex, marital status

Table 3 The association between maternal age and the risk of ASD, age 7

Maternal Age	Model A	Model B	Model C	Model D	Model E	Model F
13-19	0.84 (0.48-1.47)	1.19 (0.53-2.66)	0.77 (0.41-1.45)	0.82 (0.39-1.74)	0.84 (0.48-1.47)	0.65 (0.33-1.30)
20-24	1.04 (0.68-1.60)	0.99 (0.56-1.73)	0.97 (0.59-1.61)	0.87 (0.46-1.65)	1.08 (0.70-1.66)	0.97 (0.55-1.73)
25-29	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
30-34	0.73 (0.47-1.27)	0.78 (0.48-1.23)	0.88 (0.56-1.39)	0.66 (0.38-1.17)	0.73 (0.47-1.14)	0.75 (0.43-1.32)
35-39	0.50 (0.25-0.96)	0.50 (0.25-0.97)	0.56 (0.27-1.16)	0.35 (0.15-0.83)	0.49 (0.25-0.96)	0.38 (0.16-0.86)
40+	1.83 (0.78-4.30)	1.79 (0.68-4.65)	2.21 (0.94-5.22)	2.59 (1.00-6.72)	1.76 (0.74-4.31)	2.66 (0.98-7.21)

Model A (crude analysis); Model B (parental age): paternal age; Model C (socioeconomic/demographic): income, deprivation, marital status, ethnicity, maternal education; Model D (maternal health): smoking, BMI, hypertension in pregnancy, diabetes in pregnancy, alcohol consumption; Model E (perinatal): gestation, birthweight, sex, type of delivery; Model F (combined): smoking, hypertension in pregnancy, deprivation, sex of infant

Table 2 The association between maternal age and the risk of ADHD, age 14

Maternal Age	Model A	Model B	Model C	Model D	Model E	Model F
13-19	1.56 (0.79-2.89)	0.95 (0.36-2.51)	1.94 (0.91-4.12)	1.43 (0.57-3.60)	1.54 (0.81-2.93)	1.5 (0.63-3.58)
20-24	0.81 (0.45-1.45)	0.76 (0.37-1.55)	0.92 (0.49-1.72)	0.72 (0.33-1.59)	0.77 (0.43-1.4)	1.01 (0.48-2.11)
25-29	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
30-34	1.01 (0.62-1.66)	1.01 (0.58-1.75)	1.04 (0.61-1.77)	1.11 (0.61-2.02)	1.07 (0.65-1.77)	1.15 (0.64-2.07)
35-39	1.09 (0.62-1.93)	1.27 (0.63-2.56)	1.15 (0.61-2.19)	1.06 (0.51-2.21)	1.19 (0.67-2.11)	1.01 (0.48-2.11)
40+	1.45 (0.48-4.35)	1.64 (0.47-5.76)	1.7 (0.58-4.95)	1.86 (0.53-6.6)	1.66 (0.55-4.98)	1.8 (0.53-6.13)

Table 4 The association between maternal age and the risk of ASD, age 14

Maternal Age	Model A	Model B	Model C	Model D	Model E	Model F
13-19	0.94 (0.54-1.65)	0.989 (0.48-2.03)	0.73 (0.36-1.46)	0.78 (0.36-1.68)	0.93 (0.53-1.63)	0.91 (0.45-1.83)
20-24	0.85 (0.54-1.34)	0.81 (0.49-1.33)	0.72 (0.44-1.17)	0.8 (0.44-1.46)	0.84 (0.53-1.32)	0.84 (0.47-1.51)
25-29	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
30-34	1.19 (0.82-1.74)	1.23 (0.82-1.84)	1.08 (0.71-1.65)	1.17 (0.73-1.87)	1.2 (0.82-1.76)	1.24 (0.8-1.94)
35-39	0.96 (0.62-1.5)	0.94 (0.55-1.63)	0.86 (0.53-1.39)	1.0 (0.58-1.74)	0.99 (0.63-1.56)	1.17 (0.7-1.96)
40+	0.37 (0.12-1.15)	0.49 (0.15-1.65)	0.38 (0.12-1.20)	0.39 (0.1-1.58)	0.37 (0.12-1.17)	0.37 (0.1-1.45)

Conclusion

Maternal ages between 30 and 39 years were found to be associated with a decreased risk of ADHD at age 7. Maternal ages of 35-39 were associated with a decreased risk of ASD in the child at age 7. Maternal age had no effect on absolute risk of ASD or ADHD diagnosis at age 14 suggesting children of younger mothers are more likely to receive an earlier diagnosis of ASD or ADHD when compared to children of women aged 30 to 39 for ADHD and 35 to 39 for ASD.



Source: <https://pixabay.com/> image by: Nathan Legakis

Due to a limited number of ASD and ADHD cases, results for mothers over 40 were limited by statistical power, warranting more research investigating the possible associations between advanced maternal and ADHD or ASD diagnosis.

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