

## Short report

## Preconception prediction of expectant fathers' mental health: 20-year cohort study from adolescence

Elizabeth Spry, Rebecca Giallo, Margarita Moreno-Betancur, Jacqui Macdonald, Denise Becker, Rohan Borschmann, Stephanie Brown, George C. Patton\* and Craig A. Olsson\*

We examined prospective associations between men's common mental disorders in the decades prior to offspring conception and subsequent paternal antenatal mental health problems. Data came from a prospective intergenerational cohort study which assessed common mental disorder nine times from age 14 to 29 years, and in the third trimester of subsequent pregnancies to age 35 years ( $N = 295$  pregnancies to 214 men). Men with histories of adolescent and young adult common mental disorders were over four times more likely to experience antenatal mental health problems. Future research identifying modifiable perinatal factors that counteract preconception risk would provide further targets for intervention.

**Declaration of interest**

None.

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Mental health problems affect one in ten men during their partner's pregnancy.<sup>1</sup> These problems tend to persist into the postpartum period<sup>2,3</sup> and predict increasing severity of maternal depression symptoms from pregnancy to postpartum,<sup>2</sup> in turn, paternal postpartum depression has been associated with adverse child mental health outcomes both via and independently of maternal depression.<sup>3,4</sup> Early identification of men at risk of antenatal mental health problems could inform the development of targeted intervention strategies within existing preconception and perinatal healthcare systems.<sup>5,6</sup> However, little is known about paternal risk factors, as prospective studies including data prior to pregnancy are scarce. Using data from a 20-year, two-generation study, we aimed to examine the extent to which common mental disorders in the decades prior to conception predicted antenatal paternal mental health problems.

**Method****Participants**

The Victorian Intergenerational Health Cohort Study (VIHCS) is a prospective study of preconception predictors of child health. It arose from a cohort study commencing in 1992 in Victoria, Australia (the Victorian Adolescent Health Cohort Study; VAHCS).<sup>7</sup> A close-to-representative sample of 1943 mid-secondary school students (943 male) was selected using a two-stage sampling procedure. Participants were assessed 6-monthly during adolescence (waves 1–6: mean age 14.9–17.4 years) and three times in young adulthood (waves 7–9: 20.7, 24.1 and 29.1 years).

Between 2006 and 2013, when participants were aged 29–35 years (encompassing median paternal age for Australian births<sup>8</sup>), the 1645 study members (773 male) still active in VAHCS were screened 6-monthly for participation in VIHCS. Study members were invited to complete telephone interviews in trimester three

(VIHCS wave 1), 2 months' postpartum (VIHCS wave 2) and 12 months' postpartum (VIHCS wave 3) for every child born during screening. Here, we used data from male VAHCS participants who participated in VIHCS. Participants' parents or guardians provided informed written consent at VAHCS recruitment, and participants provided informed verbal consent at subsequent waves. Data collection protocols were approved by the human research ethics committee at the Royal Children's Hospital, Melbourne, Australia.

**Measures****Exposure**

Preconception common mental disorder was measured at VAHCS waves 1–7 using the Revised Clinical Interview Schedule (CIS-R), with caseness defined as score  $\geq 12$  to identify mixed depression–anxiety symptoms at a level lower than major depressive or anxiety disorder, but which a general practitioner would view as clinically significant.<sup>9</sup> At VAHCS waves 8–9, we used the 12-item General Health Questionnaire (GHQ-12) to identify symptoms of psychological distress.<sup>10</sup> GHQ-12 caseness was defined as standard score  $\geq 3$ ,<sup>11</sup> previously found to indicate a CIS-R threshold of  $\geq 12$ .<sup>9</sup> Continuity of mental disorder was defined as none, adolescent-only, young adult-only, or adolescent and young adult disorder.

**Covariates**

Analyses were adjusted for health risk behaviours ( $\geq 20$  drinks on one day in the past week, daily smoking, and weekly cannabis use at one or more adolescent waves), Australian-born/not Australian-born, and participants' parents' education and separation/divorce status.

**Outcome**

Antenatal mental health was assessed at VIHCS wave 1, in trimester three of each subsequent pregnancy, using the GHQ-12.<sup>9–11</sup>

\* Joint senior authors.

**Table 1** Estimated associations between preconception continuity of common mental disorder and mental health problems in the third trimester of 295 pregnancies to 214 men

Preconception common mental disorder	Antenatal mental health problems									
	Crude risk				Unadjusted model			<sup>a</sup> Adjusted model		
	<i>N</i>	<i>n</i>	%	(95% CI)	RR	(95% CI)	<i>P</i>	RR	(95% CI)	<i>P</i>
None	183	10	5.40	(2.00–8.80)	ref			ref		
Adolescent only	46	4	9.70	(0.44–18.97)	1.63	(0.49–5.41)	0.423	1.47	(0.45–4.87)	0.525
Young adult only	34	8	22.78	(7.52–38.04)	3.86	(1.37–10.90)	0.011	3.75	(1.37–10.22)	0.010
Adolescent and young adult	32	9	27.90	(11.17–44.64)	5.30	(2.13–13.18)	<0.001	4.60	(1.71–12.35)	0.003

Estimates were obtained from imputed data. Frequency estimates were calculated using imputed percentage estimates and total number of pregnancies. Preconception common mental disorder at waves 1–7 defined as Revised Clinical Interview Schedule score  $\geq 12$  and at waves 8–9 defined as General Health Questionnaire (GHQ) score  $\geq 3$ . Antenatal mental health problems defined as GHQ score  $\geq 3$ . RR, risk ratio.

<sup>a</sup>. Model adjusted for health risk behaviours ( $\geq 20$  drinks on one day in the path week, daily smoking, and weekly cannabis use) at one or more adolescent waves, country of birth, and participants' parents' education and separation/divorce status.

## Analysis

We estimated the prevalence and relative risks of paternal antenatal mental health problems stratified by continuity of preconception common mental disorder, using generalised estimating equations owing to family clustering. We included participants assessed in all phases: adolescence, young adulthood, and antenatal. Missing preconception data were addressed using multiple imputation. Most variables had fewer than 10% values missing; only four had 10–20% (common mental disorder, risky drinking, cannabis use and smoking at wave 6). Estimates were obtained by pooling results across 50 imputed data-sets using Rubin's rules.<sup>12</sup> We used Stata 14.2.<sup>13</sup>

## Results

Supplementary Appendix A, available at <https://doi.org/10.1192/bjo.2017.10>, shows the flow of men through VAHCS and VIHCS. Of 332 male VAHCS participants who reported 545 pregnancies during VIHCS recruitment, 214 (65%) men participated in VIHCS with 295 (55%) pregnancies. VIHCS participants were less likely to use cannabis weekly in adolescence ( $P=0.007$ ) or be born outside Australia ( $P<0.001$ ), and more likely to have at least one parent who completed high school ( $P=0.001$ ), than those who did not participate, but did not differ on other preconception analysis variables (supplementary Appendix B).

Antenatal mental health problems were reported in 23 (10.7%, 95% CI 6.6–14.9) men and 31 (10.5%, 95% CI 7.0–14.0) pregnancies. In total, 85 (39.7%) men reported preconception common mental disorder at least once: 35 (16.4%) adolescent only; 25 (11.6%) young adult only; and 25 (11.6%) both adolescent and young adult (supplementary Appendix C).

In over two-thirds of pregnancies where men reported antenatal mental health problems, there was a history of preconception common mental disorder, compared with around one-third of those without antenatal problems (68.1% (95% CI 49.8–86.3) *v.* 34.3% (95% CI 28.3–40.1)). Those with preconception common mental disorder in both adolescence and young adulthood had the greatest risk of antenatal mental health problems (adjusted RR (aRR) 4.60, 95% CI 1.71–12.35), and those with common mental disorder in young adulthood only were also at increased risk (aRR 3.75, 95% CI 1.37–10.22) (Table 1).

Men with a history of persistent common mental disorder from adolescence to young adulthood did not go on to experience mental health problems in 23 (72.1%, 95% CI 55.4–88.9) pregnancies. For ten (31.9%, 95% CI 14.4–49.4) of the 31 pregnancies during which men reported antenatal mental health

problems, there was no history of preconception common mental disorder.

## Discussion

Overall, one in ten men reported antenatal mental health problems, similar to a recent meta-analytic estimate of third-trimester prevalence of 9%.<sup>1</sup> In over two-thirds of these pregnancies, there was a history of common mental disorder prior to conception. Our findings suggest that mental health problems in the transition to parenthood are often a continuation or recurrence of persistent or recent preconception problems.

Nearly three-quarters of men with preconception common mental disorders did not experience antenatal mental health problems. This may reflect the natural resolution of mental health problems for some men during young adulthood.<sup>7</sup> Previous research has found that, overall, men's mental health does not worsen from preconception to expectant fatherhood.<sup>14,15</sup> Our findings are consistent in that overall prevalence was similar across the preconception and antenatal windows (supplementary Appendix C), but the lack of prior history in one-third of antenatal cases suggests that risks are heightened for some. Other factors may increase or mitigate risk, including physical health and perceived stress,<sup>16</sup> partner's mental health,<sup>1</sup> partner conflict, and social support.<sup>17</sup>

Strengths of this study include the prospective two-generational design, and repeated assessment of common mental disorder across adolescence and young adulthood. Our sample size was small, and results may not be generalisable to trimesters one and two, or to younger and older fathers. Attrition and non-response may have affected results. We used multiple imputation to address biases due to missing VAHCS data. This would not have addressed differential recruitment to VIHCS; nonetheless, prevalence of adolescent common mental disorder did not differ between VIHCS participants and non-participants. We did not use diagnostic measures and our estimates of association are likely to be conservative, as greater continuity might be expected for more severe disorders.

A number of countries have moved to implement or improve maternal mental health screening antenatally, but fathers have yet to be systematically included.<sup>18</sup> Given that risk for antenatal mental health problems is high for men with a persistent or proximal preconception history, an opportunity exists during pregnancy and the perinatal period to identify and support fathers with pre-existing vulnerability. Particularly in light of men's disinclination to proactively seek help for mental health problems,<sup>19</sup> early intervention to improve adolescent mental health may also yield benefits for their own continuing mental health and that of future generations.<sup>6</sup>

**Elizabeth Spry**, BA (Hons), Research Officer, Centre for Adolescent Health, Murdoch Children's Research Institute, Melbourne, and PhD candidate, Centre for Social and Early Emotional Development, School of Psychology, Faculty of Health, Deakin University, Geelong; **Rebecca Giallo**, PhD, Senior Research Fellow, Healthy Mothers Healthy Families group, Murdoch Children's Research Institute, Melbourne; **Margarita Moreno-Betancur**, PhD, Postdoctoral research fellow, Clinical Epidemiology and Biostatistics Unit, Murdoch Children's Research Institute, Melbourne, and Melbourne School of Population and Global Health, University of Melbourne; **Jacqui Macdonald**, PhD, Lecturer in Psychology, School of Psychology, Faculty of Health, Deakin University, and Honorary Research Fellow, University of Melbourne and Murdoch Children's Research Institute; **Denise Becker**, MBIstats, Biostatistician, Centre for Adolescent Health, Murdoch Children's Research Institute, Melbourne; **Rohan Borschmann**, PhD, Senior Research Fellow, Centre for Adolescent Health, Murdoch Children's Research Institute, Melbourne, and Honorary Research Fellow, Melbourne School of Population and Global Health, University of Melbourne and Institute of Psychiatry, Psychology & Neuroscience, King's College London, London; **Stephanie Brown**, PhD, Senior Principal Research Fellow and Head of the Healthy Mothers Healthy Families group, Murdoch Children's Research Institute, Melbourne, and Honorary Professorial Fellow, University of Melbourne; **George C. Patton**, MD, Professorial Fellow in Adolescent Health Research, University of Melbourne, and Senior Principal Research Fellow, National Health and Medical Research Council; **Craig A. Olsson**, PhD, Professor and Head of the Centre for Social and Early Emotional Development, School of Psychology, Faculty of Health, Deakin University, and Honorary Principal Research Fellow, University of Melbourne and Murdoch Children's Research Institute, Australia

**Correspondence:** Elizabeth Spry, Murdoch Children's Research Institute, Royal Children's Hospital, Flemington Road, Parkville 3052, Melbourne, Australia.  
Email: elizabeth.spry@mcri.edu.au

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## Supplementary material

Supplementary material is available online at <https://doi.org/10.1192/bjo.2017.10>.

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