

Health-related behaviours and weight status of expectant fathers

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Parents play a determining role in their children's health and wellbeing from preconception onwards.¹ Influence occurs via a range of pathways including epigenetic, environmental and behavioural mechanisms.^{2,3} In terms of the latter, modifiable behaviours include those relating to smoking, alcohol consumption, physical activity and diet, each of which has implications for the health and wellbeing of parents and their children.^{4,5} The development and implementation of effective programs designed to improve parents' lifestyle behaviours are recognised as important elements of comprehensive efforts to optimise the outcomes for parents and their offspring.^{4,6}

The antenatal (or prenatal) period is an especially critical phase of child development,⁷ making it important to understand parents' lifestyle behaviours over this period. To date, the majority of research investigating the nature, prevalence and consequences of modifiable lifestyle behaviours during the antenatal period has focused on mothers.^{8–10} Indeed, definitions of 'antenatal care' typically refer solely to the care of women during their pregnancy.^{1,11} Pregnancy is recognised as a period during which women are likely to be more receptive to behavioural change due to concerns about the health and wellbeing of their babies,¹² and a variety of antenatal health programs and services are available to assist expectant mothers to adopt healthier lifestyles.¹³ For

Abstract

Objective: Little attention has been given to the health status and lifestyle behaviours of expectant fathers. This study aimed to examine health-related variables in a cohort of expectant fathers to identify potential focus areas for interventions designed to optimise health and wellbeing outcomes in this group.

Methods: Partners of pregnant women who accessed antenatal services at a large maternity unit in a Western Australian hospital were recruited as part of the ORIGINS Project. Analyses were conducted on data from 498 expectant fathers who were primarily of mid and high socioeconomic status.

Results: Participants reported relatively low levels of smoking and alcohol consumption and higher physical activity compared to national averages. Weight status was consistent with population norms for adult males: 76% were overweight or obese and 62% had a waist girth ≥ 94 cm.

Conclusions: Expectant fathers may benefit from health interventions, especially in relation to managing their weight during this phase of their lives and beyond.

Implications for public health: Pregnancy represents a valuable opportunity to engage fathers-to-be in health interventions. Given identified links between paternal weight status and offspring outcomes, interventions focusing on achieving and maintaining a healthy weight among expectant fathers could be beneficial for families.

Key words: ORIGINS Project, antenatal, fathers, paternal, pregnancy

example, maternal weight gain and diabetes during pregnancy are associated with poorer birth outcomes and increased risk of cardiometabolic diseases in offspring later in life and hence are screened for, monitored and managed during pregnancy.¹⁴

In recent years, there have been calls for greater attention to be given to the health status and health-related behaviours of fathers.^{15–18} In particular, very little is known about the lifestyle behaviours of fathers during the antenatal period and how these

may affect their own health and wellbeing and that of their children.¹⁹ A recent study reporting longitudinal data from the United States showed the transition to fatherhood to be associated with weight gain and lower self-reported health,²⁰ and recent Australian research found that a substantial minority of expectant and new fathers felt undervalued and isolated.²¹ The need to better address fathers' needs has been recognised in the National Men's Health Strategy 2020–2030,²² although the focus is on the preconception

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and postnatal phases, with little consideration given to the important antenatal phase.

To address the current lack of information on Australian expectant fathers, the primary aim of the present study was to assess health-related factors in a cohort of men with pregnant partners. A secondary aim was to explicate factors associated with any identified health-related problems apparent within the group. This information is needed to inform future antenatal interventions designed to enhance fathers' lifestyle behaviours to improve outcomes for themselves and potentially for their offspring. Investment in such interventions could produce multi-generational health improvements with corresponding gains in individuals' quality of life and system-wide reductions in healthcare costs.

Methods

The study was approved by the Ramsay Health Care Western Australia/South Australia Human Research Ethics Committee (reference

number 1536). All participants provided written informed consent.

Expectant fathers were recruited as part of the ORIGINS Project.²³ ORIGINS is a community-based, birth cohort study based at the Joondalup Health Campus in Western Australia. It was established in 2017 to recruit 10,000 mothers, with follow-up of mothers and their offspring for five years after birth. Partners accompanying ORIGINS expectant mothers to antenatal visits were invited to enrol in a 'fathering' sub-study. Most of the invited partners agreed to participate, with only around one in ten declining the invitation.

As part of their engagement in the study, the partners completed a questionnaire and had their height, weight and waist girth measured. Body mass index (BMI) was subsequently calculated using height and weight scores. Height was measured with a calibrated stadiometer, without shoes or hair ornaments, to the nearest 1 mm. Weight was measured using a calibrated scale, without shoes and in light clothing, to the nearest

0.1 kg. Waist girth was measured using a standard tape measure marked in millimetres, at the mid-point between the lowest lateral margin of the ribs and the highest lateral margin of the iliac crests, in the horizontal plane, to the nearest 1.0 cm.

The questionnaire contained items relating to age, self-rated health, socioeconomic status and lifestyle behaviours (physical activity, smoking status and alcohol consumption). Age was derived from the reported date of birth. The self-rated health item asked, "How would you describe your physical health?", with responses on a five-point scale from 'Excellent' to 'Poor'.²⁴ Responses were reverse scored for analyses. Participants were asked to provide their residential postcode, from which socioeconomic status (SES) was calculated using the Australian Bureau of Statistics' Socioeconomic Index for Areas Index of Relative Socio-Economic Disadvantage.²⁵

Physical activity was measured using items from the Active Australia Survey that assess time spent engaging in walking, gardening/yard work, moderate physical activity, vigorous physical activity and strength training.²⁶ Alcohol consumption was measured by asking respondents if they drink and, if so, how regularly and in what quantities.²⁷ Smoking status was assessed by asking whether respondents smoked and, if so, how many cigarettes per day. Those smoking seven or more cigarettes per week were classified as current smokers.²⁸ The physical activity, alcohol and smoking data were dichotomised according to compliance with current health recommendations. Although dietary intake was recognised as an important health-related behaviour, the need for a concise, one-page survey instrument that could be readily completed by fathers precluded the use of a food frequency questionnaire.

Between October 2017 and March 2020, 502 participants (498 males and 4 females who were non-birthing partners of pregnant women) completed the survey and physical assessment. Analyses were conducted on the data from the 498 male participants. Table 1 shows the sample profile in comparison to national data for Australian males in the same age range (18–59 years).

Descriptive statistics were calculated for each of the assessed variables. Based on the results (outlined below), univariate regression analyses were conducted to identify

Table 1: Sample profile (n=498).

	Sample		Australian population of males aged 18-59 years ⁵⁹⁻⁶³
	n	%	%
Age (years)			
18-25	29	6	20
26-35	301	60	26
36-45	157	32	23
46-59	11	2	30
Socioeconomic status^a			
Low (deciles 1-4)	38	8	40
Mid (deciles 5-8)	245	51	40
High (deciles 9-10)	194	41	20
Current smoker (yes)	62	13	17
Alcohol consumption: Av. >2 standard drinks/day	59	12	24
Body mass index category			
Underweight	2	<1	<1
Normal weight	116	23	25
Overweight	229	46	42
Obese	151	30	33
Girth ≥94cm	309	62	60
Physical activity			
Meets MVPA guideline of 150 mins/week	310	62	50
Meets strength training guideline of 2+ sessions/week	141	29	25
	M (SD)	Range	M
Age	33.65 (5.57)	18-59	-
Girth (cm)	98.31 (12.44)	64-140	98.0
Self-rated health^b	3.50 (0.84)	1-5	-

Notes:

MVPA = moderate to vigorous physical activity

a: As per the Australian Bureau of Statistics' Socioeconomic Index for Areas.⁵⁸

b: Measured on a five-point scale with response options: Excellent, Very good, Good, Fair, Poor; reverse scored

factors associated with BMI score, treated as a continuous variable. Multiple linear regression was then undertaken including the variables found to be significant at $p < 0.05$ in the univariate analyses. The listwise deletion method was used to treat missing values.

Results

Almost two-thirds of the sample (60%) was aged 26–35 years, with an average age of 34 years (Table 1). The sample was skewed towards higher SES, with only 8% residing in postcodes assigned to the first to fourth SES deciles. On average, self-reported health was good to very good (mean of 3.50 on a five-point scale). Distributions across the four BMI categories (underweight, normal weight, overweight, and obese) and average girth measures were very similar to national figures: three-quarters (76%) of participants were overweight or obese and almost two-thirds (62%) had a girth of 94cm or greater (indicative of excess visceral fat²⁹).

Reported lifestyle behaviours were favourable compared to national data. Thirteen per cent reported being current smokers (compared to 17% of males aged 18–59 years nationally) and 12% reported consuming an average of more than two drinks per day (24% nationally). In terms of physical activity, 62% reported engaging in at least 150 minutes of moderate to vigorous activity per week (50% nationally) and 29% engaged in strength training at least twice per week (25% nationally).

Given the finding of favourable outcomes for all variables except those relating to weight status, BMI was selected as the dependent variable for subsequent analyses. This focus was deemed to hold the most potential for identifying opportunities for improving the health of expectant fathers. The univariate analyses identified age, SES, self-rated health and regular strength training (2+ times per week) as being significantly associated with BMI score (see Table 2). Once these variables were incorporated into the multiple regression model, all variables except engagement in regular strength training remained significantly associated with BMI score (see Table 3). The model accounted for 17% of variance in BMI. Older expectant fathers, those with lower levels of self-rated health and those of lower SES were more likely to have higher BMI scores.

Discussion

The major finding of this study was that despite exhibiting a lower prevalence of unhealthy lifestyle behaviours (smoking and alcohol consumption) and somewhat higher prevalence of physical activity, this sample of expectant fathers had comparable levels of overweight and obesity relative to national averages for men in the same age range (18–59 years). This is of concern given the considerably younger average age of the sample; 66% were aged 18–35 years compared to 46% of males nationally. Obesity levels typically increase with age,³⁰ indicating that the expectant fathers in this sample could have been expected to have had lower average BMI and waist girth scores relative to the national population that includes a larger proportion of older men. The weight status results are therefore worthy of further investigation in light of the identified relationships between paternal BMI and children’s health outcomes such as higher BMI, type 1 diabetes and impaired neurodevelopment.^{4,31–34}

The overall lack of modifiable factors associated with the participants’ BMI statuses observed in the regression analyses reflects the highly multifactorial nature of obesity,³⁵

which decreases the likelihood of individual specific factors being significant predictors in their own right. The observed lack of association with the physical activity variables supports research demonstrating the primary influence of food intake in determining body weight³⁶ and highlights the importance of ensuring men of child-bearing age have the knowledge, skills and motivation to consume a healthy diet. Young men in particular have been identified as a group requiring effective intervention programs to improve their dietary intake.^{37,38}

The smoking and alcohol results in the present study are important in the context of research identifying relationships between paternal tobacco and alcohol use and negative health outcomes in offspring.^{39,40} The lower prevalence rates of these behaviours are consistent with prior US research on changes in health behaviours in the transition to fatherhood²⁰ and may therefore suggest the potential utility of efforts to encourage a larger proportion of expectant fathers to view their partner’s pregnancy as an opportunity to undertake health-promoting lifestyle changes.

Similarly, the results relating to paternal physical activity are promising and indicate the need for further research to assess the

Table 2: Univariate regression analyses results for factors associated with Body Mass Index score (n=498).

	B	SE	β	p	95% CI for B
Age	0.11	0.04	0.13	0.005	0.03, 0.18
Socioeconomic status ^a	-0.01	0.01	-0.11	0.022	-0.02, -0.00
Meets MVPA guideline of 150 mins/week (0=no, 1=yes)	-0.25	0.43	-0.03	0.570	-1.09, 0.60
Regular strength training (2+ times/week) (0=no, 1=yes)	-0.97	0.47	-0.09	0.038	-1.88, -0.06
Current smoker (0=no, 1=yes)	0.24	0.63	0.02	0.703	-1.00, 1.49
Consumes av. >2 drinks per day (0=no, 1=yes)	0.77	0.65	0.05	0.235	-0.50, 2.04
Self-rated health ^b	-2.12	0.23	-0.38	<0.001	-2.57, -1.66

Notes:

MVPA = moderate to vigorous physical activity

a: As per the Australian Bureau of Statistics’ Socioeconomic Index for Areas.²⁵

b: Measured on a five-point scale with response options: Excellent, Very good, Good, Fair, Poor; reverse scored

Table 3: Multiple linear regression results for factors associated with Body Mass Index score (n=467).

Independent variable	b	SE	95% CI for b	β	p	Part r
Age	0.11	0.04	0.04, 0.18	0.13	0.002	0.02
Socioeconomic status ^a	-0.01	0.01	-0.02, 0.00	-0.09	0.039	0.01
Regular strength training (2+ times/week) (0 = no, 1 = yes)	0.01	0.45	-0.88, 0.89	0.00	0.989	0.00
Self-rated health ^b	-2.12	0.25	-2.60, -1.64	-0.38	<0.001	0.13

Notes:

Missing data treated listwise

a: As per the Australian Bureau of Statistics’ Socioeconomic Index for Areas.²⁵

b: Measured on a five-point scale with response options: Excellent, Very good, Good, Fair, Poor; reverse scored

extent to which men may be receptive to incorporating more exercise into their lifestyles in preparation for becoming a father. However, although compliance with physical activity guidelines was higher among the participants relative to national averages for men in the same broad age range, more than one-quarter were not meeting the minimum of 150 minutes of moderate to vigorous physical activity per week and more than two-thirds did not undertake the minimum of two strength-training sessions per week. Previous research shows paternal physical activity levels to be positively associated with offspring activity levels,⁴¹⁻⁴³ highlighting the importance of encouraging greater compliance with activity guidelines among fathers to enhance both their own and their children's health outcomes.

Implications for policy and practice

Antenatal programs are routinely provided for pregnant women, but there is little focus on the needs of expectant fathers. There is an identified need for explicit consideration of fathers in such programs to better reflect their important role during pregnancy and beyond.⁴⁴ The results of the present study indicate the utility of further work exploring whether their partner's pregnancy constitutes a period during which men are receptive to lifestyle changes that will benefit themselves, their partners and their children. An additional advantage of this approach could be that sharing the responsibility for adopting a healthier lifestyle during pregnancy between men and women may assist in alleviating any perceptions by expectant mothers that they are alone in facing expectations of self-sacrifice for the benefit of their babies.^{12,45}

The finding that 76% of the sample was either overweight or obese and that 62% had high waist girth measurements points to the importance of weight management as a key component of future healthy lifestyle programs that are developed for expectant fathers. Diet is often a focus of maternal antenatal information resources,⁴⁶ indicating the potential to extend the focus of such resources to the household rather than individual dietary patterns. The inverse relationship identified between BMI and self-rated health in this sample suggests that those with excess weight may at some level be aware of the adverse implications for their health, which may, in turn, result in heightened interest in receiving assistance to

address their weight at this important point in their lives. However, this remains speculative, and the average self-rated health score of 3.5 (out of a possible 5) combined with the high overweight and obesity rates and girth measures indicates that at least some participants were unaware of their weight status and/or the relationship between weight status and health outcomes.

Limitations and future research directions

The primary limitation of this study was the confinement of sampling to a single maternity hospital in Western Australia, resulting in a sample largely comprised of mid- and high-SES participants. This is likely to have affected the results relating to healthy lifestyle behaviours due to lower prevalence of smoking and physical activity insufficiency among those of higher SES,^{47,48} but is less likely to have affected the alcohol results due to little variation in long-term alcohol harm risk status by SES.⁴⁹ In addition, the younger age of the sample relative to the national comparison group limits the ability to determine the extent to which differences in the observed prevalence of the assessed lifestyle behaviours can be attributed to fatherhood status. These limitations should be addressed in future research involving more extensive recruitment across multiple geographical areas.

Further limitations relate to the lack of inclusion of dietary and mental health data. Fathers' nutrition-related behaviours are associated with dietary intake among their offspring,⁵⁰ and their mental health is associated with their children's emotional and behavioural outcomes.⁵¹⁻⁵³ These are therefore important elements to include in future research designed to provide a more comprehensive account of paternal attributes that are likely to affect the health and wellbeing of offspring. Efforts could also be made to objectively assess participation in relevant lifestyle behaviours to overcome the limitations associated with self-report data (e.g. the use of pedometers or actigraph devices to measure physical activity and saliva tests to determine nicotine use). Finally, Aboriginal and Torres Strait Islander status data for participants were not available, preventing the inclusion of this variable in analyses.

Of note is that prior studies examining paternal lifestyle behaviours have predominantly focused on the

preconception^{e.g.54,55} and post-birth phases,^{e.g.41,50} limiting the ability to compare the present results with previous research. However, our findings raise the possibility that fathers' health-related intentions and behaviours may differ during the antenatal period compared to other times in their lives, and that this window may be an opportunity for effective intervention. Initially, further work is needed to assess the prevalence and outcomes of specific behaviours during the antenatal period among a more representative sample, especially in terms of: i) whether the identified patterns of lifestyle behaviours reflect intended changes made in preparation for fatherhood; ii) whether any lifestyle changes made by fathers during the antenatal period are maintained post-birth; iii) the extent to which expectant fathers are receptive to lifestyle interventions; and iv) which forms of intervention are most effective in achieving change during pregnancy and beyond. There has been some research in this vein for maternal behaviour change that has yielded mixed outcomes,^{13,56-58} but there is a lack of corresponding studies in expectant fathers.

A particular strength of this research is its nesting within the broader ORIGINS study that is collecting data from pregnant women and their offspring. The present study therefore represents a starting point for multi-generational research that includes consideration of fathers' health-related characteristics. Future research can link the results from the expectant fathers participating in this study with their partners' and children's health outcomes. This has the potential to provide important and novel insights into how fathers' health can be enhanced for the benefit of themselves and their families.

In conclusion, this study represents an initial effort to examine health-related variables in a cohort of expectant fathers to identify focus areas for interventions seeking to optimise health and wellbeing outcomes in this group. This approach reflects a growing awareness that pregnancy can constitute an important window of opportunity for engaging with fathers for their own and their families' benefit. There is the potential for existing infrastructure designed for maternal health checks to be cost-effectively leveraged to provide touchpoints for men at this critical time in their lives. The results of this study indicate that weight management may be an especially important health issue to address at this time.

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