European Journal of Obstetrics & Gynecology and Reproductive Biology 236 (2019) 148–153

Contents lists available at ScienceDirect

European Journal of Obstetrics & Gynecology and Reproductive Biology

journal homepage: www.elsevier.com/locate/ejogrb

Full length article

Fetal growth and maternal alcohol consumption during early pregnancy

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ARTICLE INFO

Article history:
Received 4 December 2018
Received in revised form 7 February 2019
Accepted 8 February 2019

Keywords:
Pregnancy
Gestational age
Birth weight
Binge drinking
Alcohol drinking
Fetal development

ABSTRACT

Objective: The relationship between light maternal alcohol consumption and fetal outcome remains contentious and the professional advice women receive is conflicting. The aim of this large epidemiological study was to examine the relationship between fetal growth and maternal alcohol behaviour before and during early pregnancy.
Study design: Clinical and sociodemographic details of women who delivered a baby weighing ≥500 g during the eight years 2010-18 were analysed. Details on lifestyle behaviour before pregnancy and at the time of the first antenatal hospital visit were computerised using a standardised questionnaire.
Results: Of 68,925 women, 33.6% abstained from alcohol consumption before pregnancy and 98.4% reported they were abstaining at their first antenatal visit. Only 1.2% reported light consumption (1–2 units/week, median 1.0 IQR 1.0), 0.4% reported moderate/heavy consumption (>3 units/week, median 4.0 IQR 4.0) and 0.3% reported binge drinking (>5 units in one sitting, median 3.0 IQR 4.0). Women who consumed alcohol in binges were more likely to be <30years whereas women who consumed alcohol weekly were more likely to be ≥30years. Women who who consumed any alcohol during early pregnancy were more likely to be multiparous, Irish-born, to have an unplanned pregnancy, to be unemployed, on medications for depression or anxiety, current smokers and abusing illicit drugs. In the absence of persistent smoking or illicit drug abuse, there was no relationship between light alcohol consumption during early pregnancy and the subsequent mean birth weight, preterm delivery (%), small-for-gestational age (%) and mean neonatal head circumference.
Conclusion(s): Women who consume alcohol should continue to be advised of the fetal and maternal risks of heavy consumption and, if applicable, of the need to quit smoking and avoid illicit drugs. However, women who have consumed alcohol before realising that they were pregnant or who consumed alcohol in light amounts during early pregnancy, may be reassured that their alcohol consumption did not impact adversely on their baby's growth.

Introduction

There is consensus worldwide that women should avoid excessive alcohol consumption or intoxication during pregnancy because it is associated with adverse fetomaternal outcomes [1]. At its most extreme, excessive consumption is associated with Fetal Alcohol Spectrum Disorder (FASD) which consists of as many as four diagnostic entities, including Fetal Alcohol Syndrome (FAS) [2]. The effects of alcohol excess depend on the pattern of exposure, the dose and the developmental stage of the embryo at the time of exposure [2,3]. Although diagnostic criteria are not standardized, a systematic review and meta-analysis of 24 studies estimated that the global prevalence of FASD was 7.7/1000 population with the highest prevalence of 19.8/1000 in the WHO European Region and the lowest of 0.1/1000 in the WHO Eastern Mediterranean Region [2]. There remain, however, significant challenges with recognition, screening and diagnosis when it comes to case ascertainment [4]. There is little consensus worldwide concerning prenatal alcohol exposure (PAE) to light or moderate maternal consumption [5]. Some guidelines recommend that women abstain completely from alcohol from conception until after pregnancy, others recommend that women cap their intake at 1–2 units 2–3 times per week [1]. The lack of consensus is,

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https://doi.org/10.1016/j.ejogrb.2019.02.005
0301-2115/

in part, because many epidemiological studies on PAE have not analysed outcomes for important confounders of fetal growth, such as maternal smoking, or for the patterns or intensity of alcohol consumption before and during pregnancy [6]. The purpose of this observational study was to examine the relationship between maternal alcohol intakes reported in early pregnancy and subsequent fetal growth.

Methods

At the woman's first antenatal hospital visit, clinical and sociodemographic data were computerised by a trained midwife as part of the medical records using the 'Euroking K2'. Euroking K2 is an electronic medical record system that has standardised question and answer fields. These fields remained unchanged over the years investigated. The pregnancy and neonatal outcomes are updated on the system following delivery and updated again before postnatal discharge. Gestational age was determined from the first day of the last menstrual period and confirmed by first trimester or early second-trimester ultrasonography in all participants. Data were analysed for women with a singleton pregnancy who delivered a baby weighing >500 g during the eight years 2010–18. Ethical approval was received by the Hospital's Research Ethics Committee (4-2013).

This study was a single centre study conducted in the Coombe Women and Infants University Hospital in Dublin, Ireland. The Hospital is one of the largest maternity units in Europe and accepts women without differentiation from all socioeconomic groups across the urban rural divide, whether they are privately or publicly funded [7]. Approximately 8000 women deliver in this hospital annually thus, is responsible for almost one in eight mothers nationally.

At the first antenatal visit women were asked: 'In the three months before pregnancy what was your alcohol consumption?' and 'How much do you currently drink?'. Alcoholic drinks were converted to units using a report on the strength of alcoholic drinks in Ireland, published by the Health Service Executive [8]. Women were then asked how many drinks they have in one sitting. These drinks were also converted to units and >5units of alcohol in one sitting was defined as 'binge drinking'.

There are no standardised definitions of light, moderate or heavy alcohol in pregnancy thus, for the purpose of the study, alcohol consumption was categorised into 'abstainers' (did not consume alcohol in pregnancy), 'light alcohol' (consumed 1–2 units of alcohol per week) or 'moderate/heavy alcohol' (consumed ≥3 units of alcohol per week). Current smokers were defined as women who reported daily smoking. Variables described as 'previous' refers to any behaviors before pregnancy.

For the purpose of this study, illicit drugs were defined as the non-medical use of a variety of drugs that are prohibited by international law. Maternal occupation was defined according to the occupational classifications used in the national census [9]. Women who had delivered more than once over the eight years had all deliveries included.

Nativity was categorised into Ireland, the United Kingdom (UK), EU14 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden), EU13 (Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia) and Other (all other countries not listed).

Pregnancy outcome data analysed included NICU admissions (NICU: includes both high dependency unit and neonatal intensive care unit admissions), Apgar scores 5 min post birth, gestational age, birth weight and head circumference. Gestational age was categorised into term (≥37 weeks) and preterm birth (<37 weeks) [10].

Birthweight percentiles were devised using the Gestation Related Optimal Weight (GROW) bulk centile calculator v8.0.1. The GROW calculator is internationally applicable and recommended by the Royal College of Obstetrics and Gynecologists for the assessment of BW [11,12] The centiles are adjusted by the calculator for known confounding variables of birth weight and gestational age including maternal anthropometry, nationality, parity and infant gender. Centiles were categorised into small-for-gestational-age (SGA) (<10th centile) and large-for-gestational-age (LGA) (>90th centile) [11].

To reduce confounding variables only women who delivered a live singleton baby, not complicated by chromosomal or congenital abnormalities, and weighing ≥500 g were included.

The data were pseudonymized on an Excel (Microsoft Corp., Redmond, WA, USA) spreadsheet. Data were analysed using the statistical software programme SPSS (IBM Corp., Armonk, NY, USA) and the online statistical programme Vassarstats [13]. The normality of continuous data was assessed, and any missing data were coded in SPSS and presented in footnotes of tables.

Characteristic and outcome data were analysed using descriptive statistics. Continuous data were reported as means and standard deviation (SD). Categorical data were reported as proportions (%). Independent samples *t*-test and one way analysis of variance (ANOVA) were used to test for mean differences between continuous variables. Differences in categorical data were evaluated by the test for differences between two independent proportions. The Kruskal-Wallis one-way analysis of variance was used to compare the medians of non-parametric data.

Logistic regression analyses were conducted to assess the characteristic and lifestyle factors associated with weekly alcohol and alcohol binges during pregnancy. The analyses were adjusted for age, parity and nationality and results were reported as adjusted odds ratios (aOR), 95% confidence intervals (CI) and p-values. Unadjusted logistic regression analyses were used to assess the associations between SGA and alcohol use alone, and in combination with, smoking and illicit drug use during pregnancy. Results were reported as odds ratios (OR), 95% confidence intervals (CI) and p-values.

Results

A total of 71,947 women delivered between the years 2010 and 2018. Following exclusions 95.8% were available for analysis. Table 1 shows the clinical and sociodemographic characteristics of the study population analysed by alcohol intake reported at the first hospital antenatal visit. Of the 68,925 women, 33.6% abstained from alcohol before pregnancy but 98.4% reported they were abstaining when they presented for hospital antenatal care. Only 1.2% reported light PAE (median 1.0 IQR 1.0 units/week), 0.4% moderate/heavy PAE (median 4.0 IQR 4.0 units/week) and 0.3% reported binging at least once since conception (median 3.0 IQR 4.0 units/week).

The characteristics of study population associated with maternal alcohol use during pregnancy are presented in Table 2. Women who consumed weekly alcohol during pregnancy were more likely than alcohol abstainers to be ≥30 years whereas women who binged on alcohol during pregnancy were more likely to be <30years (both $p = 0.014$). Both weekly alcohol consumers and women who binged on alcohol during pregnancy were more likely to be taking prescribed anxiolytics or antidepressants, have an unplanned pregnancy, smoke, and use illicit drugs during pregnancy (all $p < 0.001$). Both groups were more likely to be Irish-born, multiparous, and be unemployed or a homemaker (all $p < 0.01$).

The pregnancy and neonatal outcomes of women who consumed alcohol in isolation and combination with smoking

Table 1
Characteristics of the study population presenting for hospital antenatal care.

	Alcohol abstainers n = 67,811	Light alcohol n = 855	Moderate/heavy alcohol n = 259	Binge(s) n = 235[a]	Total n = 68,925
Age (years)(mean ± SD)	31.4 ± 5.6	32.7 ± 5.5***	31.7 ± 6.4	31.0 ± 6.3	31.4 ± 5.6
BMI (kg/m^2)(mean ± SD)	25.5 ± 5.5	25.1 ± 5.4	25.5 ± 5.2	25.7 ± 5.7	25.5 ± 5.5
Irish-born (%)	69.9	82.6***	89.6***	91.1***	70.1
Obese (%)	16.9	12.9***	15.1	13.6	16.9
Nulliparas (%)	40.1	37.8	26.3***	30.2**	40.0
Unplanned pregnancy (%)	29.5	32.4***	55.2***	56.8***	29.6
No folic acid (%)	5.3	8.0***	15.6***	14.5***	5.4
Unemployed (%)	10.2	11.9	20.2***	21.2***	10.3
Homemaker (%)	18.9	18.8	35.0***	35.1***	19.0
Domestic violence (%)	1.0	1.5	3.5***	3.4***	1.0
Prescribed anxiolytics/antidepressants (%)	2.1	3.6***	7.7***	6.0***	2.1
Self-reported current depression (%)	1.6	3.6***	6.2***	6.4***	1.6
Self-reported postnatal depression[b] (%)	7.5	10.9**	8.9	11.6*	7.5
Smoker <11 cigarettes/day (%)	10.2	19.6***	35.7***	36.2***	10.4
Smoker ≥11 cigarettes/day (%)	1.8	5.5***	22.9***	21.7***	1.9
Illicit drugs use during pregnancy (%)	1.6	4.1***	4.6***	6.8***	1.7

Binge(s); consumed >5 units of alcohol in one sitting at least once in pregnancy.
Asterisk compare all alcohol consuming groups to alcohol abstainers. *p < 0.05, **p < 0.01, ***p < 0.001.
[a] Binge(s) group also contains women who consumed weekly alcohol.
[b] Includes multiparas women only.

and illicit drugs are presented in Table 3. Women who drank light weekly alcohol had neonates with birth weights on average 81.6 g (95% CI 22.5–140.8, p = 0.002) heavier and had longer gestations (mean difference 0.2weeks, 95% CI 0.2-0.4, p = 0.026) than alcohol abstainers. Alcohol use alone did not increase the risk of any adverse outcome investigated above that of alcohol abstinence except for moderate/heavy weekly alcohol which was associated with an increased rate of SGA (p = 0.008). The median number of units of alcohol consumed in the moderate/heavy weekly alcohol group was 4.0 IQR 2.5 units/week whereas the median number of drinks per week consumed by the light alcohol group was 1.0 IQR 1.0 (p < 0.001) and in women who binged on alcohol it was 2.0 IQR 4.0 (p < 0.001).

Table 4 shows the relationship between SGA and the combined use of alcohol, drugs and smoking during pregnancy. Due to sample size constraints, women who engaged in weekly alcohol and alcohol binges were combined into one group 'current alcohol'. The effect of moderate/heavy alcohol consumption on the risk of SGA shown in Table 3 may have been diluted by light alcohol and binges because the odds ratio for SGA was not increased beyond that of alcohol abstainers. The only groups that had increased odds ratios for SGA above that of alcohol abstainers included women who continued to smoke during pregnancy. Drug and alcohol use alone or combined had no additional effect on the risk of SGA. Alcohol and smoking had a higher risk of SGA compared to smoking alone (OR 1.5, 95% CI 1.2–1.9, p < 0.001). However, women who smoked and drank alcohol had an almost 2 fold-higher rate of smoking ≥11 cigarettes/day compared to women who smoked and did not consume alcohol (29.0% vs. 14.7%, p < 0.001).

Discussion

We found that in a large cohort of women, one third abstained from alcohol consumption before pregnancy and the majority reported abstaining when they presented for their first hospital antenatal visit. There was no relationship between light alcohol intake during early pregnancy and aberrant fetal growth in the absence of persistent maternal smoking.

Our findings are consistent with other studies. In a systematic review and meta-analyses of 36 studies, light to moderate PAE was not associated with an increased risk of low birth weight, SGA or preterm delivery [6]. Furthermore, a prospective cohort study of 4496 women found that early pregnancy alcohol consumption was associated with a reduced odds of low birth weight [14].

The prevalence of maternal smoking we found in early pregnancy, however, is at variance with previous reports from Ireland. In a systematic review and meta analysis of global prevalence of maternal alcohol use, the rate for Ireland was reported as 60.4% (95% CI 42.8–76.8%), the highest of 50 countries [2]. Another international study reported a range of alcohol consumption during pregnancy in Ireland of 20–80% [15].

One of these studies was questionnaire based in a highly selected nulliparous (n = 1766) population who were selected based on their risk of developing preeclampsia later in pregnancy. Data was collected in the second trimester where PAE included any alcohol consumption before the woman realised she was pregnant [16]. This study, found no association between PAE before 15 weeks gestation and adverse pregnancy outcomes. A second study was a questionnaire conducted nine months postpartum (n = 10,953) whereby 20% of women in 2008-9 reported consuming any alcohol throughout pregnancy, including before a positive pregnancy test [17].

The third study was a postal questionnaire sent to 1212 mothers 2–7 months postpartum [15]. Of the 718 respondents, 77% reported alcohol consumption before pregnancy which fell to 46% in pregnancy, including the time before a pregnancy test was positive. As pregnancy advanced more women abstained and few women reported consuming more than 1–2 units per week.

Our findings indicate that once women realised that they were pregnant, the vast majority chose to abstain and the number of women reporting a high consumption of alcohol or binge drinking was low. However well intended, it is important therefore that reports on the rate of alcohol consumption during pregnancy in Ireland are not unduly alarmist [2].

Our findings also provide further support for those guidelines that have concluded that there is no evidence of harm if women confine their alcohol intake to 1–2 units once or twice a week [18]. Advocating that all women should completely abstain from alcohol from conception until after delivery may be impractical, particularly as one third of all pregnancies in our study population were unplanned.

In the absence of scientific evidence showing that light PAE poses a risk, it has been argued that complete abstinence should be recommended based on the "Precautionary Principle" because the

Table 2
Characteristics of study population associated with maternal alcohol use during pregnancy.

		Weekly alcohol use during pregnancy		Alcohol binges during pregnancy	
	n	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Age					
≥30 years	45343	Reference	Reference	Reference	Reference
<30 years	23582	0.8 (0.7-0.9)	0.014	1.4 (1.0-1.8)	0.014
Nativity					
Irish-born	48331	Reference	Reference	Reference	Reference
UK	1801	1.2 (0.8-1.6)	0.391	0.7 (0.3-1.7)	0.483
EU 14	1118	1.1 (0.7-1.6)	0.751	0.7 (0.2-2.1)	0.494
EU 13	8580	0.4 (0.3-0.5)	<0.001	0.2 (0.1-0.4)	<0.001
Other	8916	0.3 (0.2-0.4)	<0.001	0.1 (0.1-0.3)	<0.001
Parity					
Multiparas	41355	Reference	Reference	Reference	Reference
Nulliparas	27570	0.8 (0.7-0.9)	0.007	0.6 (0.5-0.8)	0.001
Body Mass Index category					
Underweight	1768	0.9 (0.6-1.3)	0.568	0.9 (0.3-2.0)	0.729
Normal-weight	35594	Reference	Reference	Reference	Reference
Overweight	19937	1.1 (0.9-1.3)	0.058	1.2 (0.9-1.6)	0.249
Obese	11626	0.8 (0.6-0.9)	0.004	0.8 (0.5-1.1)	0.174
Employment status					
Professional/managerial	17761	Reference	Reference	Reference	Reference
Other non-manual/skilled manual	26003	0.9 (0.8-1.1)	0.216	1.9 (1.2-3.0)	0.009
Semi-skilled/unskilled manual	4623	1.0 (0.8-1.4)	0.767	3.8 (2.0-7.4)	<0.001
Unemployed	7050	1.8 (1.5-2.3)	<0.001	6.9 (4.1-11.5)	<0.001
Homemaker	12976	1.5 (1.2-1.8)	<0.001	5.8 (3.6-9.3)	<0.001
Pregnancy intention					
Planned	48461	Reference	Reference	Reference	Reference
Unplanned	20414	1.6 (1.4-1.9)	<0.001	3.3 (2.5-4.4)	<0.001
Folic acid					
Yes	65077	Reference	Reference	Reference	Reference
No	3680	2.4 (1.9-2.9)	<0.001	3.4 (2.3-4.9)	<0.001
Smoking during pregnancy					
No	60417	Reference	Reference	Reference	Reference
<11cigarettes/day	7178	3.2 (2.7-3.7)	<0.001	7.3 (0.5-10.0)	<0.001
≥11 cigarettes/day	1297	6.9 (5.6-8.6)	<0.001	23.2 (16.2-33.3)	<0.001
Illicit drug use during pregnancy					
No	677450	Reference	Reference	Reference	Reference
Yes	1467	2.6 (1.9-3.5)	<0.001	3.7 (2.7-4.9)	<0.001
Prescribed antidepressants/anxiolytics					
No	67450	Reference	Reference	Reference	Reference
Yes	1467	1.9 (1.4-2.6)	<0.001	3.9 (2.3-6.6)	<0.001

Adjusted for age, parity and nativity. UK – United Kingdom. EU14 - Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden. EU13 - Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

level of safety to exposureis unknown [19]. However, logically this principle could be extended to other beverages women consume during pregnancy, for example, high sugar drinks and caffeinated drinks.

In clinical practice, adherence to a policy that links any PAE with increased fetal risks means that women who consume alcohol at any stage during pregnancy may be unnecessarily worried throughout pregnancy . This may also lead to guilt feelings if there is an adverse pregnancy outcome albeit completely unrelated to PAE. It is notable that women who report alcohol consumption in early pregnancy often have other health issues and may be already prescribed medications for anxiety. Chastising women in the antenatal clinic for light alcohol consumption is unlikely to improve fetal outcome and may discourage women from reporting adverse lifestyle behaviours.

A strength of this research is that it is a large epidemiological study where the details maternal lifestyle behaviours were well characterised in a standardised way at the first antenatal clinic visit. Unlike previous research, fetal outcomes were analysed by the amount of alcohol consumed as well as the patterns of alcohol consumption. Furthermore, data were analysed in the presence and absence of important confounders such as persistent maternal smoking. The study design minimised recall bias and the study population was nationally representative. A further strength was the routine sonographic dating of pregnancy which allowed for weight for gestational age to be calculated accurately.

A potential limitation is that details of lifestyle behaviour were self-reported. However, unlike smoking, alcohol consumption may be episodic and there are no good long term biomarkers [20]. If alcohol consumption during pregnancy was not disclosed and there were adverse consequences in individual cases, this would have negatively affected the results in the abstainers group. Certain data, such as maternal infection and chronic diseases, were not of sufficiently high quality, thus, we were unable to control for these

Table 3
Alcohol consumption during early pregnancy and neonatal outcomes in the study population.

	Abstainers	Light alcohol	Moderate/heavy alcohol	Alcohol binge(s)	Total
Alcohol users only	n = 59065	n = 570	n = 65	n = 95	n = 59,795
Birthweight (grams)(mean ± SD)	3467.8 ± 547.4	3549.4 ± 530.8**	3464.7 ± 669.1	3483.3 ± 608.8	3468.6 ± 547.5
Head circumference (cms)(mean ± SD)	35.0 ± 1.7	35.2 ± 1.3	35.1 ± 1.4	35.2 ± 1.5	35.0 ± 1.7
Gestation (weeks)(mean ± SD)	39.5 ± 1.9	39.7 ± 1.8*	39.4 ± 2.4	39.4 ± 2.4	39.5 ± 1.9
SGA[a] (%)	10.1	8.9	19.0**	14.0	10.1
LGA[a] (%)	8.8	10.0	12.7***	8.6	8.8
Preterm birth (%)	5.0	4.2	7.7	5.3	4.9
Apgar <7 @ 5 min (%)	0.7	0.2	0.0	1.1	0.7
NICU (%)	6.0	5.3	6.2	2.1	5.9
Alcohol users and smokers	n = 66700	n = 723	n = 125	n = 219	n = 67,767
Birthweight (grams)(mean ± SD)	3437.3 ± 558.3	3489.3 ± 544.7*	3246.7 ± 720.8***	3233.5 ± 678.8***	3436.8 ± 559.2
Head circumference (cms)(mean ± SD)	35.0 ± 1.7	35.1 ± 1.3	34.8 ± 1.4	34.7 ± 1.6	35.0 ± 1.7
Gestation (weeks)(mean ± SD)	39.5 ± 1.9	39.7 ± 1.8*	39.0 ± 2.6*	39.2 ± 2.5	39.5 ± 1.9
SGA[a] (%)	11.9	13.6	26.8	28.7***	12.0
LGA[a] (%)	8.1	9.0	8.9	5.1*	8.2
Preterm birth (%)	5.3	4.6	12.0	8.3*	5.4
Apgar <7 @ 5 min (%)	0.7	0.1	0.8	2.3**	0.7
NICU (%)	6.3	5.4	8.0	10.0*	6.3
Alcohol users, smokers and illicit drug users	n = 67811	n = 750	n = 129	n = 235	n = 68,925
Birthweight (grams)(mean ± SD)	3434.5 ± 559.3	3480.7 ± 546.0	3245.9 ± 716.0***	3229.3 ± 687.9***	3434.0 ± 560.2
Head circumference (cms)(mean ± SD)	35.0 ± 1.7	35.0 ± 1.4	34.8 ± 1.4	34.7 ± 1.6	35.0 ± 1.7
Gestation (weeks)(mean ± SD)	39.5 ± 1.9	39.7 ± 1.8*	39.0 ± 2.6*	39.2 ± 2.4	39.5 ± 1.9
SGA[a] (%)	12.0	14.1	27.6***	29.7***	12.1
LGA[a] (%)	8.1	8.6	8.7	5.6	8.1
Preterm birth (%)	5.4	4.5	12.4***	7.7	5.4
Apgar <7 @ 5 min (%)	0.7	0.1	1.6	2.1**	0.7
NICU (%)	6.3	5.6	8.5	11.5	6.4

Current smokers and illicit drug users excluded.
Binge(s); consumed >5 units of alcohol in one sitting at least once in pregnancy.
Multiple pregnancies and babies ≤500 g excluded.
Preterm defined as <37 weeks.
SGA; Small-for-gestational-age. LGA; Large-for-gestational-age. NICU; Neonatal Intensive Care Unit.
[a] Missing data from total population; 528 as GROW calculator unable to calculate customised centiles due to missing required data for one or more of the following; maternal anthropometrics, nationality, infant birthweight, gestational age or infant gender. P-values compare all other categories to 'Abstainers'. *p < 0.05, **p < 0.01, ***p < 0.001.

Table 4
The risk of small for gestational age in babies who were exposed to combinations of adverse health behaviours during pregnancy.

	During pregnancy	
	Abstainers	Current alcohol
No other adverse behaviour		
n	58601	716
% SGA	10.1	10.5
OR (95% CI)	Reference	1.0 (0.8-1.3)
P-value	Reference	0.709
Current smoker		
n	7557	334
% SGA	25.9	35.0
OR (95% CI)	3.1 (3.0-3.3).	4.8 (3.8-6.1)
P-value	<0.001	<0.001
Illicit drug user		
n	605	17
% SGA	9.4	23.5
OR (95% CI)	0.9 (0.7-1.2)	2.8 (0.9-8.4)
P-value	0.607	0.077
Current smoker and illicit drug user		
n	504	30
% SGA	34.5	40.0
OR (95% CI)	4.7 (3.9-5.7)	5.9 (2.9-12.4)
P-value	<0.001	<0.001

Current alcohol includes women who consumed alcohol weekly at any level or alcohol in binges. Binge(s); consumed >5 units of alcohol in one sitting at least once in pregnancy.

confounding factors in the statistical analysis. Lastly, due to lack of follow up data, we were unable to explore the effect of alcohol on outcomes that may occur beyond that of growth restriction and the first week of life.

In the largest Irish study to date, we found that the number of women reporting heavy alcohol intake during pregnancy when they presented for hospital care was low and that light PAE was not associated with aberrant fetal growth. In addition, women who reported excessive alcohol consumption may have other addictions and psychosocial problems which need to be addressed by the maternity services. We suggest that future public health policies and interventions should prioritise the small number of women at risk from excessive alcohol consumption during pregnancy.

Statement of contribution

CR contributed to the conception and design of the study, analysis and interpretion of data as well as the writing and revising of this original article. EOM and SS contributed to the interpretation of data, drafting and revising of the article. MJT and BE contributed to the conception of the study, interpretation of data as well as the drafting and revising of this article.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of interests

None of the authors have any conflicts of interest to declare.

Acknowledgements

We would like to acknowledge Emma McNamee in the IT Department of the Coombe Women and Infants University Hospital for collating the information for database used in this study. We would also like to thank the midwives in the antenatal clinic for their role in data collection.

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