Jones, A, Hunt, S and Rose, A

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ORIGINAL ARTICLE

Psychologically Traumatic Birth: Associations with Increased Drinking and Delayed Risk of Alcohol Harm in Mothers

Andrew Jones[1] · **Sally Hunt**[2] · **Abigail K. Rose**[1]

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Abstract

Background Experience of trauma is a risk factor for increased alcohol use. Childbirth can be psychologically traumatic but there is minimal research investigating whether psychological birth trauma (PBT) is a risk factor for increased maternal drinking or what factors are associated with alcohol use in mothers who have and who have not experienced PBT.

Method An online observational survey of mothers with ($n = 291$) and without ($n = 230$) experience of PBT. Participants self-reported alcohol use and completed measures of alcohol harm, drinking motives, trauma (general and birth related) and mental health. Free text options were included to complement quantitative data.

Results Irrespective of PBT status, stronger endorsement of negative reinforcement drinking motives (e.g. coping) predicted higher alcohol use and hazardous drinking. However, children's age influenced this relationship. In mothers with a history of PBT, negative reinforcement drinking motives predicted weekly alcohol use and alcohol harm as their children grew older. In mothers without PBT, positive reinforcement drinking motives predicted greater weekly alcohol use as children grew older, but negative drinking motives predicted reduced drinking. Multiple aspects of the parental role influenced drinking (e.g. coping-based motives) and non-drinking (e.g. child well-being motives) behaviour. Changes in motives from pre-motherhood to motherhood focused around a shift from positive to negative reinforcement drinking motives. Mothers with PBT reported mental health symptoms as both a reason to drink and not to drink alcohol.

Conclusion This study provides novel evidence on maternal alcohol use, and how PBT may influence drinking behaviour in mothers. Importantly, PBT may be a type of trauma which is associated with a delayed risk for maladaptive alcohol use and risk of alcohol harm. This evidence can facilitate more research aimed at understanding this important public health issue and can inform alcohol interventions tailored to the needs of mothers which consider the long-lasting impact of birth experience.

Keywords Psychological Birth Trauma · Maternal Drinking · Alcohol · Postnatal PTSD · Mental Health · Stress · Coping · Drinking Motives · Positive Reinforcement · Negative Reinforcement

Extended author information available on the last page of the article

Increases in women's drinking are narrowing the gender gap previously observed in alcohol consumption (Slade et al., 2016; Inst. Alcohol Studies, 2017). For females aged 15–49 years, which covers typical childbearing age and early to mid-motherhood, alcohol is a leading risk factor for ill health and early mortality (Griswold et al., 2018). The rise in women's drinking is a result of multiple factors including women's increasing financial independence and access to drinking spaces (Atkinson et al., 2019). Additionally, two-thirds of alcohol in the UK is purchased from off-licensed premises and drinking at home is common (Public Health England, 2017). Therefore, alcohol is increasingly affordable and available for women, including mothers who may have once had fewer opportunities to go out and drink due to traditional childcare responsibilities. These changes have been reflected by social media posts and targeted advertising which suggest mothers need and/or deserve alcohol (Atkinson et al., 2019; Basch et al., 2021).

Any rise in women's alcohol use should be of concern given that women can be more vulnerable to alcohol's negative effects, experiencing alcohol harms sooner and at lower drinking levels than men (Erol & Karpyak, 2015; Peltier et al., 2019). In addition to women's health and well-being, drinking during motherhood also increases the risk of a range of secondary harms. For instance, non-dependent hazardous (15–35 units p/week, 1 unit = 8 g alcohol) and harmful (> 35 units p/week) maternal drinking is associated with increased risk of sudden infant death syndrome, numerous adverse child/adulthood experiences (e.g. hospitalisation, accidental medicinal poisoning, mental ill health, alcohol problems (McGovern et al., 2018; Raitasalo et al., 2019; Rossow et al., 2016) and impaired mother–child relationships (Rossen et al., 2016).

Although motherhood may be assumed to be a period of lower alcohol use, this is transient. Evidence shows that any reduction in drinking because of pregnancy is not maintained by 12 months postpartum (Borschmann et al., 2019). Additionally, 40% of pre-pregnancy risky drinkers return to risky alcohol use within 3 months postpartum (Jagodzinski and Fleming, 2007) and 18% of UK mums are hazardous drinkers (Syed et al., 2018). These findings indicate the important and varied roles alcohol plays throughout the changing phases of motherhood, which often co-occur within the context of midlife transitions; alcohol can be a tool to cope, to socialise and celebrate, to reconnect with partners and to capture a sense of identity away from being a mother (Basch et al., 2021; Kersey et al., 2022; Ujhelyi Gomez et al., 2022).

Given these significant harms, it is important to identify risk factors for increased alcohol use in motherhood. In non-maternal populations (e.g. war veterans, child and adult victims of neglect and abuse, witnesses to natural disasters), trauma is a well-established risk factor of increased alcohol consumption and harm (Brady & Back, 2012; Cerdá et al., 2011; Goodwin et al., 2017). Although evidence suggests that women maybe particularly vulnerable to trauma and subsequent increased drinking (Kachadourian et al., 2014), a trauma that has received little attention in terms of alcohol use is psychological birth trauma (PBT), which primarily affects the birthing mother. Up to 48% of women report their child's birth as psychologically traumatic (Alcorn et al., 2010; Grekin & O'Hara, 2014; Yildiz et al., 2017) and prevalence rates of birth-related posttraumatic stress disorder (PTSD) and posttraumatic stress (i.e. subclinical PTSD) are 4.7% and 12.3%, respectively, in mothers (for fathers, the rates are 1.2% and 1.3%) (Heyne et al., 2022).

Longitudinal research demonstrates that mental ill health usually precedes increased alcohol use (Bell & Britton, 2014) providing support for self-medication theory, with individuals drinking to cope with negative symptoms, e.g. stress and anxiety, low mood, sleep disturbances and unwanted/intrusive thoughts (Khantzian, 1997). The self-medication hypothesis aligns with the motivational model of alcohol use (Cox & Klinger, 1988),

which argues that drinking occurs within a positive and negative reinforcement framework. People are motivated to drink to gain something positive (e.g. enjoying time with friends) or remove something negative (e.g. to feel less stressed) (Cooper, 1994). Evidence suggests that coping-based motives may mediate the relationship between mental ill health and alcohol use and/or harm (Collins et al., 2018). This fits with existing literature demonstrating that drinking for negative reinforcement motives is associated with higher levels of alcohol use and, even when controlling for level of consumption, drinking to cope is related to greater alcohol harm (Anderson et al., 2013; Irizar et al., 2021; Wicki et al., 2017). Recently, an Australian study was the first to show a positive association between PBT and greater reported hazardous alcohol use and coping-based drinking motives in mothers (Doherty & Hunt, 2022).

However, not everyone copes with mental ill health by increasing their alcohol use. Although there are higher rates of hazardous and harmful drinking in populations experiencing moderate and severe mental ill health (including PTSD), relative to those not experiencing mental ill health, there are also higher rates of abstinence (Goodwin et al., 2017; Puddephatt et al., 2021). This suggests mental ill health and trauma may have a polarising effect (Nordløkken et al., 2013), for instance evidence from COVID19 suggests around 25% of people reported increased alcohol use during lockdown while 25% reported decreased alcohol use. Both groups reported greater levels of anxiety and depression compared to the group whose alcohol use remained stable (Schmits & Glowacz, 2022), and alcohol use in response to trauma has been associated with higher levels of pre-trauma drinking (Irizar et al., 2021; Schmits & Glowacz, 2022). It is therefore important to confirm whether PBT may be a risk for increased drinking in mothers, but also to identify the factors that may influence alcohol use following PBT.

The current study aimed to recruit mothers with or without experience of PBT to determine whether alcohol use and/or drinking motives differ across these two groups, and the factors which may be associated with increased and decreased alcohol consumption. We predicted that PBT and endorsement of negative reinforcement drinking motives would be associated with higher reported alcohol use and harm. We also included other possible predictors of alcohol use such as general well-being, mental health (depression, anxiety, stress), length of time since child birth and historical alcohol use to explore whether they predicted our primary outcomes (alcohol use and drinking motives).

Methods

Participants

Five hundred twenty-one women took part in the study. Participants were 18 years or over, lived in the UK, spoke fluent English, were not currently pregnant, had experienced childbirth and had at least one dependent child (defined as being under 18 and living with the participant). Recruitment was designed specifically to over-recruit from maternal populations with experience of psychological birth trauma (including advertising through online birth trauma support networks) to allow statistical comparisons with maternal populations without experience of PBT. Our minimum sample size was 264, based on detecting an effect size of $d = 0.37$ on differences AUDIT total scores between individuals with birth trauma vs without (Doherty & Hunt, 2022), with 90% power, alpha = 0.05 and unbalanced allocation (~ 1.5 with birth trauma). This would also reliably allow us to conduct

regression analyses predicting 10% of the variance with 9 predictors (90% power), requiring $N \sim 188$. We powered to 90% as some of our predictors were somewhat exploratory, and we attempted stringent error control.

Measures

Demographics Age, ethnicity, sexuality, relationship status, number and age of children, highest level of education, current occupation, average household income (before tax) and UK area of residence were reported.

Alcohol use disorder treatment Participants were asked if they had sought treatment to reduce their alcohol use before or since becoming a mother.

Pre-pregnancy alcohol use Participants were asked if they drank alcohol before they became pregnant (yes/no), and to report approximately how many/what type of drinks they consumed per week.

Pregnancy alcohol use Participants were asked if they drank during their pregnancy. Responses were no, yes (before I knew I was pregnant), yes (on special occasions), yes (around once a month), yes (2–4 times a month), yes (1–2 times a week), yes (3–5 times a week), yes (most days).

Alcohol use disorders identification test (AUDIT (Babor et al., 2001)) 10 items, assessing alcohol use and potentially harmful drinking behaviour. Female specific scores, as recommended by WHO, were used to calculate low risk drinking (score 0–6), medium risk/hazardous (score 7–15), high risk/harmful or probable dependence (> 16) (Babor et al., 2001). The AUDIT showed excellent internal reliability in this sample (Omega = 0.85).

Timeline Followback (TLFB (Sobell & Sobell, 1993)) Using a diary format, participants were asked to record how many and what type of drink (e.g. large/small glass of wine, pint/half pint of beer) they had consumed over the past 7 days. Drinks were converted to UK units (UK unit = 8 g alcohol) and weekly alcohol unit consumption calculated.

Maternal Drinking Motives Scale (M-DMS (Rose et al., 2024)) Comprises 13 items, loading on to two factors: positive reinforcement motives (5 items) and negative reinforcement motives (8 items). Possible responses were 'Always/Almost always' (score 1), 'Often' (2), 'Sometimes' (3), 'Rarely' (4), 'Never/Almost never' (5). Scoring was reversed, so that higher scores are indicative of stronger endorsement of the motives. Reliability for the positive reinforcement motives was Omega = 0.89, and for the negative reinforcement motives was Omega = 0.89.

Motives to reduce/stop drinking Based on current evidence and public engagement activities, 10 items assessed reasons for reducing or stopping their drinking. Respondents selected as many reasons as applicable (see supplemental for data).

Birth Trauma All participants were asked if, irrespective of whether they sought help or had people around that understand their experience, did they think you have experienced a psychologically traumatic birth (yes or no). If they answered yes, participants were then

asked whether they felt they had recovered from the experience (yes, somewhat, no, don't know).

City Birth Trauma Scale (City BiTS (Ayers et al., 2018)) Assessed psychological childbirth trauma with 29 items, measuring PTSD according to DSM-5 diagnostic criteria. A total score can be computed (ranging 0–60) but several studies have found items cluster around (1) birth-related PTSD symptoms and (2) general PTSD symptoms. All three measures are recommended to be calculated. The reliability for the total score was Omega = 0 0.96.

Depression Anxiety and Stress Scale (DASS-21 (Lovibond & Lovibond, 1995)) Comprises 21 items measuring three factors: depression, anxiety, stress. Participants are asked to indicate the extent to which each item applied to them over the past week. Responses range from 0 (Did not apply to me at all) to 3 (Applied to me very much or most of the time). Subscales can be computed separately for Stress, Anxiety and Depression, or a total score used for General well-being. Here we used the total score, which demonstrated excellent reliability (Omega = 0.96).

Brief Trauma Scale (BTQ (Schnurr et al., 1999)) Assesses exposure to traumatic events (non-birth specific) covering war conflict, natural/technological disaster, life-threatening illness, serious injury, childhood abuse, adult physical and sexual assault, and witness to a situation when another person was seriously injured or killed. If the participant responds 'yes' to any event, they are then asked whether they thought they would be seriously injured or killed by the event, and whether they were seriously injured. For this study, we added a question to determine whether the event occurred before they became pregnant with their first child. The number of traumatic events experienced was the outcome (0–10).

World Health Organisation Well-being Scale (WHO-5, (Topp et al., 2015)) assesses current well-being with 5 items which can be scored from 'At no time' (0) to 'All of the time' (5) A total score is computed by summing responses and multiplying by 4. Items are positively framed (e.g. I have felt cheerful and in good spirits) and was therefore included as the last scale (Omega = 0.93).

Qualitative questions At the end of the M-DMS, participants were asked if they felt their motives had changed since becoming a mother and, if so, how. Following the 'Motives to reduce/stop drinking' items, participants were invited to provide other reasons. At the end of the study, participants were invited to provide any comments they felt relevant regarding any aspect of the survey.

Procedure

The online survey was posted through social media sites (e.g. Twitter, Facebook) and Prolific (an online research recruitment platform). Participants provided informed consent before the survey was launched. The survey presented questions/scales following the order in which they are described above. We also included some questions on menopause, and pre-pregnancy alcohol and drug use (not reported here, please contact lead author for more information). Each section provided an overview of the topics to be covered and a reminder that responses were anonymous and that questions were asked with compassion and without judgement. Two attention checks were distributed throughout the scale to identify the

possibility of careless responses (Jones et al., 2022). There were only 2 participants who failed the attention checks. Removing these participants did not significantly influence the results, therefore data and analyses are presented with all participants to reduce the possibility of introducing bias (Jones et al., 2023). The study ran from June to August 2022 and took approximately 20–25 min to complete.

Data Analysis

There were small amounts of missing data across the questionnaires and demographic information [e.g. 1.87% missing responses on the AUDIT, 0.67% missing on the DASS-21, 0.80% missing on the positive motives, and 0.88% on the negative motives scales]. Therefore, we adopted a multiple imputation approach using the MICE package (van Buuren and Groothuis-Oudshoorn, 2011) in R. In the imputation models, we included all collected variables and computed relevant questionnaire total scores, before conducting multiple imputation. We used 5 imputations in line with guidance (Schafer & Olsen, 1998). For subsequent analyses, we present the statistics from the pooled models. If there was any discrepancy between these models and the complete-case model, it is noted below and reported in full in online supplementary materials.

We inferred socioeconomic status (SES) from education level based on Robinson et al. (2022), in which individuals who were educated to A-level or above were categorised as high SES and below A-level were classed as low SES. For ethnicity, we used white and non-white to create analytically meaningful categories due to small numbers in different non-white ethnicities. In line with Doherty and Hunt (2022), we compared individuals who self-reported birth trauma vs no birth trauma using independent samples *t*-tests. Then, we conducted multiple regressions separately for the birth trauma and non-birth trauma groups, with AUDIT total, Units consumed and AUDIT category (non-hazardous vs hazardous) as the outcome variable and DASS total, BiTS, Ethnicity (white or non-white; Education (A-levels and above or below), WHO-5, positive and negative drinking motives, BTQ, youngest child's age and the interaction with negative motives as the predictor/exposure variables.

We took several alcohol-related measures which may be associated with current drinking behaviour. However, due to either very low reporting (e.g. ~ 1.5% of respondents having received any treatment for AUD), or known biases in reporting historical alcohol use (e.g. due to stigma and/or recall decay) (Jacobson et al., 1991; Johnson et al., 1997), these were not included in analysis.

Data and analysis scripts can be found: https://osf.io/bct2j.

For the qualitative data, we employed thematic analysis (Braun & Clarke, 2006), conducted in a group session (Campbell et al., 2021). We followed the six phases of thematic analysis, providing anonymised data (by PBT experience) to all group members to allow familiarisation with the data and independent initial generation of codes. A theoretical approach guided coding across three a priori topics: motives not to drink, motives to drink, changes in motives from before pregnancy to during motherhood. The group (consisting of authors [AR, AJ], independent experts in alcohol research, and led by an expert qualitative researcher) met to review themes and discuss patterns within the data. Given the data comprised of short survey-based responses with little context, semantic themes were generated and discussed. This group analysis approach helped to establish trustworthiness of the data (Nowell et al., 2017), which was seen as an important consideration allowing generation of meaning while avoiding over-interpretation of the responses.

Results

Descriptive Differences Between Birth Trauma and Non-birth Trauma Groups

Descriptive statistics for the sample split by self-reported PBT are shown in Table 1. There were no differences between the two groups in terms of age ($p = 0.732$), youngest child's age ($p = 0.478$) or proportion of women in high/low SES ($p = 0.499$). Women from the PBT group scored higher on measure of depression, anxiety and stress (DASS: $p < 0.001$), psychological birth trauma (BiTS total, $p < 0.001$, birth related, $p < 0.001$ and general PTSD, $p < 0.001$, symptoms), general trauma (BTQ, $p < 0.001$) and they reported lower well-being ($p < 0.01$). Women from the PBT group were also more likely to be of white, than non-white, ethnicity ($p = 0.037$).

Alcohol-Related Outcomes by Psychological Birth Trauma Status

There was a significant difference in positive reinforcement drinking motives, with individuals who reported PBT scoring significantly lower on this scale. However, there were no other significant differences (see Table 2).

Table 1 Descriptive statistics for demographics, mental health, birth trauma and general trauma, split by group

	Birth trauma—($N = 230$)	Birth trauma + ($N = 291$)
	Means (SDS)	
Age	34.73 (6.57)	34.65 (5.87)
DASS total	19.22 (19.56)	36.93 (27.21)
BiTS total	8.45 (8.69)	25.07 (15.69)
BiTS birth related	1.56 (3.14)	11.74 (8.86)
BiTS general PTSD	6.77 (7.36)	13.27 (8.93)
WHO total	56.52 (19.85)	40.44 (21.48)
BTQ total	0.96 (1.16)	1.38 (1.37)
Youngest child age	6.29 (5.05)	5.97 (5.12)
Pre-pregnancy alcohol use	20.82 (30.42)	21.82 (22.11)
	N	
High SES	163 (71.2%)	216 (74.2%)
Low SES	66 (28.8%)	75 (25.8%)
White	202 (87.8%)	272 (93.5%)
Non-White	28 (12.2%)	19 (6.5%)
Treatment for AUD (yes)	2 (< 1%)	7 (2%)
Any drinking during preg	47 (20.4%)	7 (2%)
Drinking until preg confirm	54 (23.5%)	75 (25.8%)
No drinking during preg 129	(56.1%)	169 (58.0%)

Legend: Descriptives based on complete case analyses. SES is inferred by highest level of education. *DASS*, Depression, Anxiety, Stress scale; *BiTs*, Birth Trauma Scale; *WHO*, World Health Organisation Well-being scale; *BTQ*, Brief Trauma Questionnaire

Table 2 *T*-tests and effect sizes for alcohol-related variables and drinking motives, split by group (values are means and standard deviations)

	Birth trauma -	Birth trauma + (df)T,p	Cohen's *d*
AUDIT	4.89 (3.85)	4.95 (4.17)	T(180) = −0.17, *p* = .861 −.02
AUDIT	10.07 (12.22)	9.51 (13.80)	T(519) = 0.49, *p* = .625 .04
Pos motives	13.04 (4.40)	12.19 (4.32)	T(375) = 2.15, *p* = .031 .20
Neg motives	14.22 (5.88)	14.51 (6.89)	T(516) = 0.51, *p* = .606 −.05

Legend: Statistics are based on pooled analyses from the imputations. *AUDIT*, Alcohol Use Disorder Identification Test

Multiple Regression Models Predicting AUDIT Scores, Hazardous Drinking and Units Consumed in Women Who Self-reported Psychological Birth Trauma

The regression models were statistically significant. Negative reinforcement motives predicted higher AUDIT scores, hazardous drinking and weekly unit consumption. The interaction between negative reinforcement drinking motives and youngest child's age was a significant predictor of alcohol consumption and AUDIT scores. Having older children and greater endorsement of negative reinforcement motives was associated with increased consumption and AUDIT score (but not hazardous drinking, when using the AUDIT cutoff score of ≥ 6 for women) (see Table 3).

Multiple Regression Models Predicting AUDIT Scores, Hazardous Drinking and Units Consumed in Woman Who Did Not Self-report Psychological Birth Trauma

The regression models were statistically significant. Negative motives were a significant predictor of drinking outcomes. The interaction between negative motives and youngest child age was significant for units consumed. However, the direction of this interaction was different to individuals who self-reported birth trauma; older children and greater endorsement of increased negative reinforcement drinking motives were associated with reduced alcohol use (see Table 4). But as this group's children aged, drinking for positive reinforcement motives was associated with higher weekly unit consumption.

Qualitative Responses

Participants were able to provide free text responses regarding their current motives against, and for, drinking alcohol, and the way drinking motives may have changed since

Table 3 Multiple regression models predicting different drinking outcomes in mothers who self-reported psychological birth trauma

	AUDIT total (beta)	Hazardous drinking (OR)	Units cons. (beta)
Age	−0.04 [−0.11; 0.04]	0.98 [0.90; 1.06]	−0.16 [−0.42; 0.10]
Ethnicity	1.32 [−0.13; 2.78]	5.22 [0.87; 31.45]	0.59 [−4.04; 5.21]
Education	−0.33 [−1.17; 0.52]	0.79 [0.33; 1.86]	−1.39 [−4.14; 1.37]
DASS total	0.01 [−0.01; 0.03]	1.01 [0.99; 1.03]	−0.01 [−0.07; 0.05]
Pos motives	0.12 [−0.10; 0.34]	1.06 [0.89; 1.26]	0.32 [−0.18; 0.81]
Neg motives	0.17 [0.07; 0.27]*	1.18 [1.07; 1.30]*	0.45 [0.12; 0.79]*
BITS general	−0.00 [−0.06; 0.06]	1.02 [0.96; 1.08]	−0.10 [−0.29; 0.09]
BITS PTSD	−0.01 [−0.06; 0.04]	0.97 [0.93; 1.02]	0.06 [−0.10; 0.22]
Well-being	0.01 [−0.01; 0.03]	1.01 [0.99. 1.04]	0.01 [−0.05; 0.08]
BTQ total	0.46 [0.17; 0.74]*	1.44 [1.08; 1.91]*	0.68 [−0.24; 1.59]
Youngest child age	−0.27 [−0.51;-0.04]*	0.82 [0.59; 1.16]	−0.83 [−1.60; −0.06]*
YCA*Neg motives	0.02 [0.01; 0.03]*	1.00 [0.99;1.01]	0.08 [0.05; 0.11]*
YCA*Pos motives	0.01 [−0.01; 0.03]	1.01 [0.99; 1.04]	0.01 [−0.05; 0.07]
Adjusted R^2	*.51*	*.45*	*.51*

*$p < .05$

Table 4 Multiple regression models predicting different drinking outcomes in mothers who did not self-reported psychological birth trauma

	AUDIT total (beta)	Hazardous drinking (OR)	Units cons. (beta)
Age	0.00 [−0.08; 0.07]	0.96 [0.89; 1.03]	−0.06 [−0.31; 0.19]
Ethnicity	1.07 [−0.18; 2.31]	2.52 [0.54; 11.69]	0.11 [−4.09; 4.32]
Education	−0.05 [−0.99; 0.90]	0.62 [0.23; 1.65]	0.64 [−2.52; 3.80]
DASS total	−0.02 [−0.06; 0.01]	0.99 [0.96; 1.01]	−0.05 [−0.16; 0.05]
Pos motives	0.00 [−0.19; 0.20]	0.96 [0.76; 1.21]	−0.24 [−0.87; 0.40]
Neg motives	0.39 [0.23; 0.55]*	1.22 [1.05; 1.41]*	1.32 [0.78; 1.86]*
BITS general	0.06 [−0.02; 0.11]	1.07 [1.00; 1.13]*	0.03 [-0.21; 0.28]
PITS PTSD	0.02 [−0.11; 0.15]	1.08 [0.95; 1.23]	0.85 [0.40; 1.31]*
Well-being	0.01 [−0.02; 0.03]	1.01 [0.98. 1.03]	0.03 [−0.06; 0.11]
BTQ total	0.29 [−0.09; 0.65]	1.22 [0.85; 1.76]	0.73 [−0.54; 2.01]
Youngest child age	0.01 [−0.22; 0.24]	0.91 [0.63;1.31]	0.04 [−0.72; 0.80]
YCA*Neg motives	−0.01 [−0.03; 0.00]	0.99 [0.98;1.01]	0.10 [−0.16; −0.04]*
YCA*Pos motives	0.02 [0.00; 0.04]	1.02 [1.00; 1.05]	0.13 [0.06; 0.21]*
Adjusted R^2	*.32*	*.37*	*.30*

*$p < .05$

becoming a mother. Of 291 respondents who reported experience of PBT, 166 (57%) provided at least one free text response, compared with 115 (49%) of the 233 respondents who did not report PBT.

Group analysis discussions resulted in data being discussed in terms of two of the a priori topics (motives not to drink and motives to drink), which both organically incorporated content regarding changes in motives. Due to the brevity of most responses, we purposefully avoided potential over-interpretation of the data and provided a description to guide future research (Braun et al., 2021). Generally, data was synthesised across the two maternal groups as there was substantial overlap in thematic content, but some key differences were identified. Overall, for 'motives not to drink' and 'motives to drink', comments were understood through multiple subthemes within an overarching theme of 'parental role'.

Parental Role

In both groups of mothers, parental roles, responsibilities and experiences were seen as factors which can be impaired by alcohol (e.g. preventing someone providing necessary care), and as factors which can affect alcohol use either by decreasing or increasing consumption. The main themes (in bold) and subthemes (italics) are described below (see Fig. 1 for a visual theme representation).

Motives Not to Drink (see Table 5 for Quotes)

Child's safety was a major theme. Respondents reported having to be sober in case their child needed them, often providing examples of *emergencies* which may require driving. This illustrates that concerns that may in reality be quite rare can be a significant motivator to reduce alcohol use, but there were also *everyday issues* of child safety which were

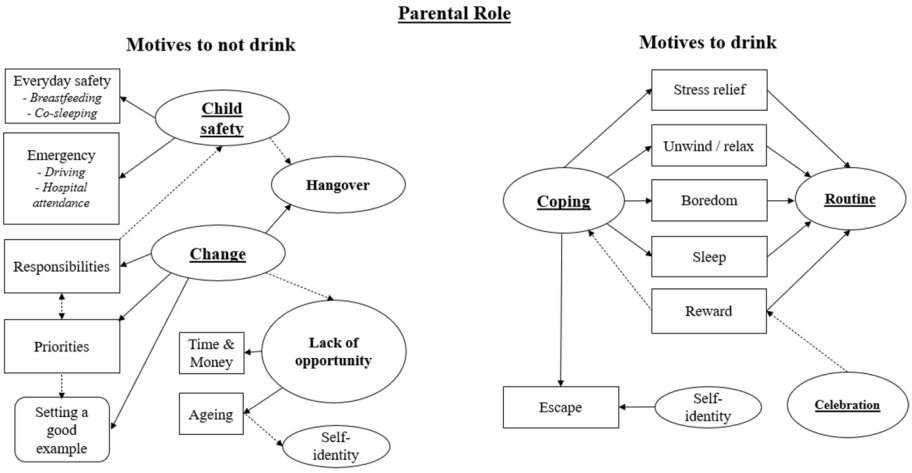

Fig. 1 Qualitative schematic. Mothers have a very strong sense of responsibility. Their priorities change to fulfil their parental role and be a good mum. This results in multiple practical and ideological reasons not to drink alcohol. However, motherhood can be very stressful, and many mothers may use alcohol to manage negative states, which increases the risk of drinking becoming part of a regular routine. In addition, alcohol can be used to celebrate and help maintain self-identities away from being a mother. Clinical and subthreshold levels of mental ill health, including those typically found in mothers, are likely to be associated with both increased and decreased levels of alcohol use

identified as reasons to avoid or reduce drinking which were strongly associated with maternal roles (e.g. breastfeeding and co-sleeping).

Change was an overarching theme, with many of the reasons given for reducing or stopping drinking illustrating complex changes during the transition to motherhood. These changes often reflected how becoming a mother alters an individual's sense of *responsibility* and their *priorities*, with the child's welfare being the primary concern. This change can be demonstrated by providing physical and emotional safety for the child but also by *setting a good example* by not drinking in front of children. More practical changes included a *lack of opportunity* to drink, either due to reduced finances or less time to socialise. This may relate to some women's awareness of changes associated with *ageing*, reporting they were now too old or boring to go out which may reflect changes in self-identity. However, one of the most dominate aspects of change was *hangovers*. Some mothers commented that their tolerance to alcohol had weakened and hangovers had become worse since becoming a mother. Additionally, hangovers were seen as barriers by some mothers in fulfilling their new maternal roles in caring for their children.

Motives to Drink (See Table 6 for Quotes)

Coping was the dominant theme, with most respondents explaining that they drank to *reduce stress, to relax and unwind.* Less common coping-based reasons focused on managing *boredom* and *sleep problems*. Respondents also reported using alcohol to *escape*, as a *reward*, and as a way to provide *comfort*, occasionally contextualising these reasons by describing a lack of social support in their lives.

Coping-based responses were often explicitly placed within the context of stress due to motherhood. Indeed, many responses concerning motives to drink highlighted a shift from

Table 5 Motives not to drink (a priori topic)

Theme	Subtheme	Quotes
Child safety	Emergencies	- *I don't want to risk having had too much to drink if something were to happen and I needed to take my child to hospital*
		- *I want to be able to act in an emergency (i.e. drive to a hospital) if it was necessary—so I do not like to drink so much that I am over the limit*
		- *I wouldn't want to get drunk and not be able to care properly for my children or if in an emergency I need to get to hospital I can't be drunk*
	Everyday	- *I used to drink often before breastfeeding*
		- *I didn't drink whilst we were co-sleeping*
		- *I decided to continue not drinking* [after pregnancy] *to ensure I was always in control and my child was completely safe*
Change	Hangovers	- *I can't cope feeling hungover with the children to care for*
		- *I can't parent a child hung over so chose not to drink*
		- *body cannot handle the hangover anymore*
	Priorities	- *I have bigger priorities now, my child means more to m*
		- *priorities have changed since having kids, especially young ones*
	Responsibilities	- *Need to be focused for my child to rely on me*
	Set a good example	- *I also refuse to drink around my children so even at family parties I won't drink*
		- *i avoid even on special occasions when my kids are with me*
	Lack of opportunity	- *I don't have the same time or money*
		- *Because I have less time to think about myself*
		- *I don't have as much time to socialise with friends during the evening/weekends*
		- *Too busy and lack of opportunity to socialise with friends/family*
	Ageing	- *I'm old and boring now*

Table 6 Motives to drink (a priori topic)

Theme	Subtheme	Quotes
Coping	Stress & relaxation	- *Increased as stress relief*
		- *I drank more because the pressures of motherhood were so stressful*
		- *I drink less for enjoyment now and more to unwind*
		- *I just have one drink to wind down after the stresses of children*
		- *I think i definitely use drinking as more of a tool for relaxation that I did prior to my child*
		- *To relax rather than have fun*
		- *It used to be more socialising and having fun. Now it is more to relax or destress*
	Comfort	- *Everything is a struggle. No family support and it feels like* [alcohol is] *the only thing that comforts me*
		- *I drink to cheer myself up if I've had a bad day*
	Boredom	- *Cope with boredom*
	Escape	- *To escape life*
		- *Not social now, more escape!*
	Reward	- *It is more likely to be a reward after a stressful day*
		- *I drink more as a 'treat'*
		- *Less about fun, more to reward myself*
		- *I no longer have much of a social life and on hard days I find myself having a drink to celebrate getting through it*
	Sleep	- *it is usually to help me sleep or to calm down*
Routine		- *Have a glass of wine most evenings once kids have gone to bed as almost feels like having wine signals the start of me time in the evening*
		- *Drink earlier in the evening and more weekdays*
Celebration (positive)		- *To celebrate getting through the working week and keeping everyone alive!*
		- *More of a special occasion*

drinking to socialise to drinking to cope. Most respondents spoke about a reduced level of socialising and/or not being bothered about socialising, and that their drinking behaviour had shifted from a way to have fun, to a way of relaxing and dealing with stress.

Routine around alcohol use was also highlighted. Some respondents talked about drinking after a long day, usually in the evening when the children were in bed and parental responsibilities were fewer. Comments also highlighted how drinking can become part of a regular routine, with women stating that having a drink signalled 'me time' and that drinking had become more common during the week.

Differences between Those with and Without a History of Psychological Birth Trauma (See Table 7 for Quotes)

Although many of the themes identified were found across our two groups of mothers, there were some findings that were unique to one of the groups. In respondents without a history of PBT, decreased alcohol use was occasionally motivated by concerns around *addiction* which either stemmed from their own alcohol use or that of a family member. Additionally, reduced drinking was sometimes placed within the context of how respondents perceived themselves—as too old and boring. This suggests that negative stereotypes around ageing and motherhood can shape some mother's *self-identities*.

In respondents with experience of PBT, increased alcohol use was commonly described as a way to cope with *mental health and well-being* issues, often explicitly linked with their birth experience and motherhood. Some women also reported using alcohol to retain some kind of *self-identity* which was distinct from being a mother and escaping from maternal responsibilities. Decreased alcohol use was also a strategy to cope with *mental health and well-being*, with respondents commenting that alcohol exacerbated mental health symptoms. Respondents with PBT tended to make comments that were more negatively valanced, with several respondents reporting real concern regarding their alcohol use (although it was not clear whether these concerns had triggered any changes in consumption behaviour).

Overall, the qualitative data illustrated a high degree of ambivalence. Many mothers perceived alcohol-related risks, especially in terms of impairing their ability to be a 'good mum' and fulfil their responsibilities. But at the same time, there was a sense that a substantial proportion of the respondents were relying on alcohol in some way. It was often viewed as integral to their ability to cope with stress and it was something they used to relax and reward themselves.

Discussion

This study examined whether alcohol use differed across mothers who did and who did not report psychological birth trauma (PBT), and whether key factors around PBT symptoms, mental il -health and well-being predicted drinking behaviour. As expected, mothers who reported PBT scored highest on a range of mental ill health and trauma scales, including birth and non-birth-related PTSD, general trauma, anxiety, depression and stress, and scored lower on well-being. However, they did not score higher on the AUDIT or report higher weekly alcohol unit consumption (relative to mothers who reported not experiencing PBT). Additionally, there was no statistically significant difference between the two

Table 7 Difference in motives between mothers with and without a history of psychological birth trauma

Group	Theme	Subtheme	Quotes
Mothers without PBT	Decreased alcohol use	Addiction	- *My mother was an alcoholic and I don't want history to repeat itself. I don't want to put my children through that*
			- *I was alcohol dependent before becoming a mother'*
		Self-identity	- *I'm old and boring now*
			- *I'm too old for nightclubs now*
Mothers with PBT	Increased alcohol use	Mental health & well-being	- *I suffer with PTSD due to a traumatic birth and I do feel like I am unable to relax sometimes*
			- *Stress, anxiety, PND, to feel good/to feel less*
			- *Didn't suffer so many feelings of anxiety, depression & overwhelm before becoming a mother*
			- *I use alcohol to detach from current difficulties, many associated with motherhood*
			- *I use alcohol to detach from current difficulties, many associated with motherhood*
		Self-identity	- *Find old me*
			- *To escape life, feel like I was before such responsibilities*
	Decreased alcohol use	Mental health & well-being	- *Because I don't like the reasons that I am drinking e.g. to reduce stress / numb myself*
			- *I suffer with panic attacks since having my baby and I am much more susceptible to these if I have alcohol in my system*
			- *Alcohol makes my symptoms from a birth injury worse*
			- *Stopped drinking because it exacerbated post-partum mental health problems*
	Concern		- *I'm worried about the impact on my mental health*
			- *i feel guilty if i drink and worry if anything might happen i might not wake up or be judged although i don't even get drunk when i drink*
			- *Wish I didn't drink as much, am seriously concerned about how much I'm drinking*

groups in terms of negative reinforcement drinking motives, but women with PBT were less likely to endorse positive reinforcement drinking motives.

These findings differ somewhat from Doherty and Hunt (2022) which is the first study, to our knowledge, to assess the associations between PBT and alcohol use. They found that women with a history of PBT had a higher AUDIT score and stronger endorsement of negative reinforcement, coping-based drinking motives than the non-PBT group. Although Doherty and Hunt did not measure weekly alcohol use in their Australian sample, our current UK samples reported low drinking levels (within the low-risk guidelines of up to 14 units [1 unit = 8 g alcohol] p/week). It is possible that our self-selecting sample were lower drinkers than Doherty and Hunt's, also suggested by our samples' lower AUDIT scores (~ 5, Doherty & Hunt: 7–9). Despite this possibility, we found that negative reinforcement drinking motives predicted higher alcohol use and harm, and hazardous drinking across our two samples. This fits with the motivational model of alcohol use and self-medication hypothesis, and supports the established literature that drinking to cope is associated alcohol harm (Bell & Britton, 2014; Collins et al., 2018; Cooper et al., 2015; Khantzian, 1997). Another salient point here is evidence suggesting that negative reinforcement drinking motives have a significant association with alcohol harm which is not mediated by level of consumption (Shuai et al., 2022). This is important as it is often assumed that harm is directly related to drinking levels. This may result in a lack of research on populations traditionally associated with lower alcohol use (e.g. mothers) but who are actually a group vulnerable to harm despite not necessarily drinking excessively.

Interestingly, in our PBT sample, but not in our non-PBT sample, we found an interaction whereby negative reinforcement drinking motives and having older children predicted higher AUDIT score and weekly consumption. It is possible that early motherhood provides some level of protection against higher levels of alcohol use, perhaps due to increased maternal responsibilities and/or sleep deprivation (Ujhelyi Gomez et al., 2022). Additionally, in women who have experience of PBT, it is common for mothers to report feeling guilty about the birth experience and impaired bonding with their child (Gökçe İsbir et al., 2022; Molloy et al., 2021; Simpson & Catling, 2016). This can result in mothers with PBT feeling they have to work extra hard to be a good mum and to 'make up' for the birth trauma (Kendall-Tackett, 2019). We tentatively suggest that this situation may result in mothers with experience of PBT using non-alcohol-based coping strategies when the child is young. However, as the child ages and maternal responsibilities change and initial feelings of guilt subside, alcohol use and coping-based drinking motives may increase. This highlights a need for longitudinal research to better understand the associations between PBT and alcohol use. Given the cohort-based evidence that by 12 months postpartum, maternal alcohol use is no longer statistically lower than pre-pregnancy drinking and by 5 years has returned to these earlier levels (Borschmann et al., 2019), longitudinal research should recruit mothers with and without PBT to control for these typical changes in drinking patterns.

There are some weaknesses to this research. Firstly, the cross-sectional nature of the data means we cannot establish evidence of causal relationships, and future research might consider longitudinal/cohort designs. Secondly, respondents were predominantly white and of higher socioeconomic status. We therefore must be cautious in generalising these novel findings to more diverse maternal groups, who may have different experiences. For example, black, Asian and other minority ethnic women are particularly at risk of negative birth outcomes and traumatic birthing experiences (MacLellan et al., 2022; Salter et al., 2023), and risk of alcohol harm differs across complex socioeconomic classes (Boniface et al., 2020). Future research should make recruitment

of diverse samples a priority, enabling a better understanding of how intersectional characteristics may affect associations between birth experience and subsequent alcohol use. Thirdly, motherhood can be stressful, the current data and existing evidence demonstrates some mothers reporting alcohol use to cope (Fleming et al., 2023; Ujhelyi Gomez et al., 2022). It is possible that these associations between maternal stress and drinking masks any unique impact of PBT on alcohol use. Alternatively, motherhood may provide a unique protective barrier against using alcohol to cope with PBT (as discussed above). Yet, even if this is the case, there are some women with PBT who are drinking to cope with their symptoms (e.g. postnatal PTSD and/or depression). Given the size of our sample, we were unable to model different types of drinkers. Future, longitudinal research should examine different drinking trajectory classes of mothers (e.g. mothers may show stable, increasing, decreasing alcohol use while others quitting drinking, see (Liu et al., 2016)) to determine the unique impact of PBT on maternal drinking. This research should also consider factors which may affect either alcohol use and/or mental health in mothers (e.g. perceived social support, stress, coping strategies (Kranenburg et al., 2023; Tadros, 2024) to better map trajectory classes.

A strength of this study is the large sample, and unique aim to understand how PBT may be associated with alcohol use in UK mothers. We also included free text responses to provide rich, qualitative data of mother's experiences. In line with existing research (Fleming et al., 2023; Ujhelyi Gomez et al., 2022), these qualitative responses highlighted that several aspects of the parental role may affect maternal drinking. Crucially, most mothers cited coping-based motives for drinking, both to deal with the everyday stresses of motherhood and specific mental health symptoms, including those associated with PBT. The responsibility to keep their children safe and the desire to provide an environment from which they and their children could enjoy this stage of life were frequent motives to reduce drinking. Both past and current experiences influenced how and why mothers drank (e.g. family history of alcohol issues, concern for current mental health, trying to retain a sense of their old self which they associated with alcohol use). This data also supports evidence that alcohol fulfils multiple roles (Kersey et al., 2022), and the argument that our lives are contextualised in the past, present and future (Kougiali, 2015). This complexity can result in ambivalence towards drinking behaviour, and this needs to be acknowledged when developing effective interventions and treatment which can be tailored to maternal drinkers.

Qualitative surveys can give a voice to individuals who may not participate in face-to-face research (particularly relevant with the current topic of maternal drinking) (Braun et al., 2021), but this was a mixed methods survey, and the qualitative responses were often short. Our independent group analysis helped to avoid over-interpretation of the data, yet we still identified important themes around the drivers of increased and decreased maternal drinking. These should be used to guide more in-depth qualitative work in this area. By understanding the complex mechanisms underlying maternal drinking, alcohol interventions tailored to the mothers lives and experiences can be developed.

Interestingly, although more variety was seen in the reported motives not to drink, the strength of the coping-based motives to drink were substantial. This highlights a real need to provide alternative, adaptive coping strategies for mothers which are appropriate for their lives (Ujhelyi Gomez et al., 2022). To note, we did not include the quantitative data on 'motives not to drink' in our primary analysis, as the measure is not validated. However, this data supports the theme of parental roles being crucial in reducing alcohol use, with the most often selected responses concerning issues such as breastfeeding, being too tired to drink, wanting to be healthy, and to set a good example (see Supplemental Table I).

Again, these can be incorporated into tailored maternal alcohol interventions and psychosocial treatments.

Some respondents left a final comment thanking the research team (‘*Thanks for looking into this, it is really important’, ‘Thank you for this important work. Women’s health, especially that of newish mothers, is seriously overlooked*’). This highlights the real need for more work in this area, and the sense from mothers that their health and well-being is largely ignored. Future research needs to provide longitudinal quantitative and qualitative cohort data to map changing drinking behaviours, mental health and well-being over time in the context of maternal lives. This is needed to identify different types of drinking trajectories and link these with (clusters of) symptoms which increase or decrease alcohol use in mothers with and without a history of PBT. For instance, positive alcohol expectancies, avoidance-based coping styles, lack of alternative coping strategies, impulsivity, pre-trauma drinking behaviour have all been identified as potentially increasing the risk of drinking to cope (Cooper et al., 1992), while other research shows onset of mental ill health (e.g. anxiety, depression) is associated with higher rates of stopping drinking (i.e. sick-quitting) in some people (Sarich et al., 2019). To our knowledge, there are no existing research cohorts that include appropriate assessment of PBT, alcohol use and harm. It is also unlikely that this research can utilise existing health records; in the UK, PBT is not routinely assessed and recorded, and it is well known that women (and maternal groups in particular) are unlikely to accurately report their alcohol use to healthcare professionals (Foster & Brown, 2017; Schölin et al., 2019).

While motherhood may introduce multiple reasons to reduce alcohol use, coping-based drinking strategies are a major issue. Drinking for negative reinforcement motives predicts higher weekly alcohol use and hazardous drinking behaviour in mothers. This predictive association remains in mothers with experience of PBT as their children get older, suggesting a possible delayed risk of PBT on hazardous drinking behaviour. We need research which enables better identification of mothers at risk of hazardous drinking and informs effective preventative health support to reduce alcohol harm.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11469-024-01302-3.

Declarations

Ethics Approval All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. All participants provided informed consent before undertaking the survey.

Informed Consent All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975, as revised in 2000. All participants provided informed consent before undertaking the survey.

Conflict of Interest The authors declare no competing interests.

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Authors and Affiliations

Andrew Jones[1] · Sally Hunt[2] · Abigail K. Rose[1]

✉ Abigail K. Rose
A.K.Rose@ljmu.ac.uk

Andrew Jones
a.j.jones@ljmu.ac.uk

Sally Hunt
sally.hunt@newcastle.edu.au

[1] School of Psychology, Liverpool John Moores University, Byrom Street, Liverpool L3 3AF, UK

[2] School of Psychological Sciences, University of Newcastle, Callaghan, Australia