The interaction of pregnancy, substance use and mental illness on birthing outcomes in Australia

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A B S T R A C T

Background: this study aimed to (1) assess the prevalence, and demographic features of women with a history of mental illness during pregnancy and childbirth, (2) investigate maternal and perinatal outcomes in relation to mental illness and substance use, and (3) determine the effects of maternal characteristics, history of mental illness and substance use on birth outcomes.

Methods: the records of 22,193 pregnant women who gave birth at one tertiary level health service comprising three maternity settings in Victoria, Australia from 2009 to 2011 were reviewed.Univariate comparisons for socio-demographic and birthing outcome variables by substance use and mental illness category were performed. A multivariable logistic regression model was developed to examine the effects of maternal characteristics on birth outcomes.

Results: mental illness was recorded for 1.08/1,000 delivery hospitalisations.Mothers with a history of mental illness had a significantly higher proportion of babies born with low birth weight (OR = 1.85, 95% CI 1.64 -2.09) and low Apgar 1 scores < 7 (OR = 1.47, 95% CI 1.26 - 1.70).Differences in health behaviours were also noted between the two groups.Babies born to women with an illicit and poly substance use history reported an average birth weight at 2,951 (SD 777) grams compared to birth weight of approximately 3,300 g of smoking and alcohol user groups, as well as shorter gestational age and lower birth weight. There was a statistically significant interaction between the effects of mental illness and substance use on birth weight. This interaction effect was not significant for gestational age. Logistic regression showed the strongest predictor of reporting a premature birth and low birth weight was using substances, recording an odds ratio of 1.95 (95% CI 1.50–2.53) and 2.73 (95% CI 2.15–3.47) respectively.

Conclusions: mental health history should be highlighted as being a common morbidity and the increased risk of poorer birth outcomes especially when the women were also using substances, alcohol or tobacco should be acknowledged by the health practitioners.

Introduction

Perinatal mental health and psychological wellbeing of pregnant women, their babies and families has been recognised in recent years as a priority issue in both international and Australian literature. It is evident that pre-existing mental illness in women is a powerful independent risk factor for adverse birth outcomes such as low weight and premature birth (Kumar et al., 1995; Witt et al., 2012). There is compelling evidence showing women are particularly vulnerable to the recurrence or emergence of mental health problems during pregnancy and the new motherhood period (Fisher et al., 2012; Oates, 2003). Empirical studies have consistently shown that the prevalence of perinatal mental health disorders among women of different cultural backgrounds ranges from 6.5% to 19.8% with increased risk of mental health issues during the postpartum period (Chen et al., 2011; Cox et al., 1993; Fisher et al., 2012; Gavin et al., 2005; Huang et al., 2007; Margaret, 1995; O'Hara and Swain, 1996; Patel et al., 2004). In Australia, the precise incidence of perinatal mental illness remains unknown and is difficult to estimate as data on women of reproductive age with mental illness are not routinely collected (O'Donnell et al., 2013) or might be due to the overlapping somatic symptoms associated with anxiety, depression and pregnancy thus symptoms of some prenatal mental illnesses are often not acknowledged (Chou et al., 2003; Yonkers et al., 2009). Nevertheless, limited available evidence in

Australia has shown the prevalence of mental health disorders in mothers has almost doubled from 76 per 1,000 births in 1990 to 131 per 1,000 births in 2005 (O'Donnell et al., 2013). It was reported that one fifth of mothers suffered depression during the post-natal year in recent Australian studies (Australian Health Ministers' Advisory Council (AHMAC), 2009; The National Health and Medical Research Council (NHMRC), 2000; Woolhouse et al., 2014). Concern about the potential for the increased risk of health issues associated with mental illness during pregnancy, childbirth and childrearing, has led to recent Australian Government initiatives within maternity services. In late 2010, The Australian Department of Health (2010) announced the initiative of the National Maternity Services Plan with a strong focus on expanding and improving perinatal mental illness screening and service to women who may be vulnerable due to medical, socio-economic and other risk factors. In Victoria, perinatal mental health service is provided through a three-tier referral and care system involving both hospital and community-based residential care teams (Fisher et al., 2011). With nearly 70% of the annual births in Victoria occurring in public hospitals, these hospitals are on the front line of providing optimum mental health care to women and their families (Department of Health, 2011). Unfortunately, the lack of studies that have addressed the relationship between maternal mental illness and birth outcomes in Victorian women of child bearing age suggests the need for an epidemiological approach to inform issues of appropriate education and resource management to health professionals in antenatal care.

The use of alcohol, tobacco and illicit drugs during pregnancy are a common source of pregnancy-related morbidity in women and their infants. These are seen as a continuing problem for Australia with an estimated 1% of women are reported to have a substance abuse related diagnosis (Australian Institute of Health and Welfare, 2014). Over the past decade the level of the women smoking during pregnancy in many Australian State and Territories is reported as approximately 10% to 20% women (Burns et al., 2008; Hayatbakhsh et al., 2011; Hotham et al., 2008; Maloney et al., 2011; O'Leary et al., 2013). Nationally, the 2013 Australian National Drug Strategy Household Survey found antenatal smoking behaviour was reported by 10.6% of pregnant women and drinking behavior (consumed ≥1 standard drink after knowledge of pregnancy) was reported by 26% of pregnant women (Australian Institute of Health and Welfare, 2014). The Report (2014) also found approximately 2% of women reported the use of marijuana or other illicit substance use during pregnancy and breastfeeding, which is a significant reduction from previously indicated 6% in early 2000 (Australia Institute of Health and Welfare, 2005). Although the Victorian population is approximately 5.5 million, and the State reported almost 74,000 births in 2012 (Department of Planning and Community Development, 2012), little data has been collected on the use of illicit drugs by pregnant women in Victoria. Furthermore, the public health concern about substance use during pregnancy has not been reflected in any State based report. This paper intends to fill this gap by studying the substance use patterns in a sample of birthing women in Victoria. Given acquisition and use of a broad range of substances by pregnant women, information about substance use in pregnancy can help those involved in the care of perinatal women and make the best of addiction services.

Empirical studies reviewed suggested a relationship between substance use by pregnant women and adverse birth outcomes, such as preterm birth and low birth weight (Havens et al., 2009; Ross and Dennis, 2009; Wiencrot et al., 2012; Xu et al., 2012). It is also known that pregnancy itself is a very vulnerable period for developing depression and other mental disorders and the adverse impact of pre-existing or newly developed mental illnesses on postpartum maternal and birthing outcomes has been clearly established (Glover, 2014). However, possible interactions involving both substance use and mental illness during pregnancy and after birth have not been highlighted in the literature. Therefore, a further aim of this study was to investigate the complex interactions between mental illness and substance use to birthing outcomes.

Methods

Participants and BOS Database

This study assessed birthing records of 22,193 pregnant women who gave birth at one tertiary level health service comprising of three maternity settings in Victoria, Australia from 2009 to 2011. Since 1993, the maternity units at these three hospitals have been using the electronic database Birthing Outcome Systems (BOS), which was designed to record pregnant women's general health and birthing outcomes as part of the national mandatory reporting requirements. The system consists of eight data entry screens that must be completed for each delivery. It includes personal data, previous obstetric history, antenatal history including complications and investigations, the onset and conduct of the labour and delivery, and neonatal and postpartum progress. Data entry screens are updated by midwifery staff in the antenatal clinic, delivery suite, and the maternity wards. The BOS system includes questions aimed to identify pregnant women's alcohol, tobacco and other substance use problems; the BOS database added questions that assess perinatal alcohol and drug use status. Women at their first antenatal visit were asked a series of close-ended questions about their current drinking, smoking, and illicit drug use behaviour (Management Consultants and Technology Services Pty Ltd, n.d).

As many health facilities in Victoria have adopted the BOS system, attending midwives and other relevant clinicians currently working in those health services have received ongoing education and training in areas such as ongoing conversations with pregnant women on their physical and mental status, data validation and accurate data entry when using the BOS system. Routine data validation and reconciliation are conducted by all participating health services to ensure data completeness and integrity. The BOS system consists of two components. The first is self-reported questionnaires administered by a midwife or obstetrician which collect information on past personal, medical, obstetric and mental health history at various time points along the birthing continuum. If any issues arise as a result of consultations, they are often discussed in detail or referral options are provided. The second component comprises the recording of antenatal, birthing and postnatal care as well as the maternal and neonatal outcomes.

Measures

The study used data extracted from the BOS database and consists of variables listed in the database. These were demographics and birthing outcomes.

Measures to assess participant demographics, such as age, marital status and mother's primary country of birth were recorded. Other maternal details such as gravidity and parity were also included in the analysis. Birthing outcome such as live or stillbirth, birth weight, 1-minute Apgar score, birth type, blood loss during delivery, gestational age, labour onset and type were recorded.

History of mental health illness, either preexisting or current diagnosis were self-reported and recorded. Questions such as "have you ever been diagnosed with mental illness" were asked. The Edinburgh Postnatal Depression Scale was used to screen women for depression during pregnancy.

Substance use was assessed by women's reported use of substances after learning they were pregnant at the first prenatal visit (this usually happens at the end of first trimester). Because the current administrative system does not record the level of alcohol and tobacco consumption, nor the status of substance prescription, it was decided to use dichotomous variables, which do not relate to level of consumption to classify the substance use. The substance variable was recoded