



Original article

Psychiatric disorders and compliance with prenatal care: A 10-year retrospective cohort compared to controls



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ABSTRACT

Background: Inadequate prenatal care has been associated with adverse perinatal outcomes. We sought to compare compliance with prenatal care visits (PCV), oral glucose tolerance test (OGTT) and serum alpha-fetoprotein (aFP) in women with psychiatric disorders (PD) and healthy controls.

Methods: Subjects were 5395 women (1043 PD and 4352 controls), members of Clalit Health Services (Tel-Aviv district, Israel), who gave birth during 2004–2014. We used Generalized Estimating Equations with binary-logistic models, considering consecutive pregnancies as repeated measures with unbalanced design. The diagnostic subgroup was the main independent, assessed once with and once without age, socioeconomic status and multiple gestation variables.

Results: Risk for non-compliance with OGTT was increased in women with depression (aOR = 1.4, 95% CI = 1.1–1.7) and schizophrenia (aOR = 1.8, 95% CI = 1.1–2.9), but not anxiety. Risk for non-compliance with aFP was decreased in women with anxiety (aOR = 0.6, 95% CI = 0.5–0.8), but women with depression and schizophrenia did not differ from controls. PD were at risk for both absence of PCV (aOR = 4.6, 95% CI = 2.7–8.0) and high utilization of PCV (>20 visits, aOR = 2.8, 95% CI = 2.1–3.7). Psychopharmacological treatment during pregnancy was associated with high utilization of PCV (OR = 2.2, 95% CI = 1.7–2.9), increased compliance with aFP tests (OR = 1.4, 95% CI = 1.1–1.7) and marginally-significant increased compliance with OGTT (OR = 0.82, 95% CI = 0.67–1.01).

Conclusion: PD under-utilized tests perceived for the wellbeing of the mother (OGTT) and over-utilize tests for the wellbeing of the fetus (aFP). PD exhibited patterns of both very low and very high utilization of PCV. Psychopharmacological treatment during pregnancy may improve some measures of compliance with prenatal care.

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1. Introduction

Pregnancy is a normal physiological process, yet complications that increase morbidity and mortality for the mother and baby occur in up to 20% of pregnancies [1]. The purpose of prenatal care is to ensure a successful pregnancy outcome when possible, including the delivery of a live, healthy fetus [1]. Prenatal care includes history taking, physical examinations, laboratory tests

and prenatal ultrasound tests [1]. Prenatal care is an important predictor of outcomes for both mothers and babies [2–4].

Women with psychiatric disorders are as likely as healthy mothers to become pregnant, and have an even higher rate of unplanned pregnancies [5,6]. Women with schizophrenia and affective disorders have increased risks for pregnancy complications [7]. Several studies examined utilization of prenatal care in women with psychiatric disorders. Although most of these studies have found inadequate utilization of prenatal care in women with psychiatric disorders [8,9], others have not [10]. Poor compliance with prenatal care in women with psychiatric disorders has been associated with adverse perinatal outcomes, including preterm births, low birth weight and small for gestational age babies compared to controls [9,10]. Most of the previous studies have focused on severe mental illness, specifically schizophrenia,

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bipolar disorder and major depression. Although one study included a group of patients with non-psychotic mental illness [9], the group was too heterogenic (including 15 women with major depressive disorder).

5 women with anxiety disorders, 12 with emotionally unstable personality disorder, 3 with post-traumatic stress disorder, 2 with severe adjustment disorder and 1 with anorexia nervosa) to permit any clear conclusions regarding these disorders. In previous studies, prenatal care has largely been considered in terms of number of prenatal visits (NPV) and the time of initiation of prenatal care. Previous studies suggest that high NPV may be associated with increased risk for negative outcomes such as induction of labor and cesarean delivery possibly due to additional testing and unnecessary interventions [11]. However, the issue of high NPV in women with psychiatric disorders has not been previously addressed. None of the previous studies included mothers with multiple gestation pregnancies (MGP), a high-risk subgroup which deserve special monitoring and treatment as part of prenatal care [12]. Moreover, to the best of our knowledge, compliance with laboratory prenatal tests in women with psychiatric disorders has not been previously examined. As laboratory studies such as infectious and genetic screening and metabolic studies (e.g., oral glucose tolerance test) are necessary in order to achieve to primary goal of prenatal care of ensuring successful pregnancy outcomes, our lack of knowledge in this regard is of major clinical concern. Finally, it is unknown whether psychiatric treatment during pregnancy can moderate the risk for non-compliance with prenatal care. To further address these issues, we conducted a retrospective cohort analysis of utilization of prenatal care in women with psychiatric disorders and healthy controls in the Tel-Aviv district of Clalit Health Services (CHS), the largest HMO in Israel, using data from 2004 to 2014.

2. Method

2.1. Procedure

In this study we analyzed patient compliance with prenatal care using the computerized database of the CHS, the largest HMO in Israel. The Tel-Aviv district of the CHS includes about 310,000 members, which represent about 40% of the district's population. The computerized database contains demographic data, number of visits to general practitioners and specialists, medical and psychiatric diagnoses, medications, laboratory tests, and results of ultrasound and imaging studies. The CHS database has been previously used in several studies (e.g., [13–15]), and the validity of its diagnoses was found to be high [13,14]. Inclusions criteria were: (1) women, (2) at least 1 live birth from October 2004 to October 2014 (i.e., *the study period*). Exclusion criteria were: (1) Teenage mothers (<18 years-old), (2) women with intellectual disability, (3) women with substance use disorders.

The study was approved by the CHS Institutional Review Board (IRB). The information received by the authors did not include identifying personal information, and the IRB approved exemption from Informed Consent (retrospective data analysis).

2.2. Subjects

Included were 5395 women. The Study group consisted of 1043 women with psychiatric disorders of mean age 30.9 ± 5.2 years (range 18–41) who have had overall 1680 pregnancies (median 2.0 ± 0.9) during the study period. The Control group consisted of 4352 women without neurological or psychiatric disorders of mean age 27.8 ± 2.9 years (range 18–46), who have had overall 5765 pregnancies (median 1.0 ± 0.9) during the study period. The psychiatric diagnoses in the database were assigned by

psychiatrists, neurologists and general practitioners according to the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) based on patient examination, coded for statistical purposes according to the 9th edition of the International Classification of Diseases (ICD-9, this is common practice in Israel). Neurological disorders were assigned by neurologists and general practitioners according to ICD-9. Diagnoses are active until cancelled by a physician seeing the patient who determines that they are no longer active. Psychiatric disorders included in the study were depressive disorders (major depressive disorder, dysthymic disorder, depressive disorder NOS), anxiety disorder (generalized anxiety disorder, panic with or without agoraphobia, social phobia), bipolar disorder 1 and 2, schizophrenia, and other psychotic disorders (delusional disorder, brief psychotic disorder, psychotic disorder NOS), using the appropriate codes from ICD-9. Psychiatric disorders codes excluded were all recorded disorders encompassed by the "Mental Disorders" section in ICD-9 (codes 290–319). Neurological disorders codes excluded were all diagnoses encompassed by the "Disease of the Nervous System" (ICD-9 codes 320–359).

The distribution of diagnoses in the study group was as follows (percentages refer to the study group): Depressive disorders (without anxiety disorders, *Depression-only group*), $N = 395$ (37.9%); Anxiety disorders (without depressive disorders, *Anxiety-only group*), $N = 241$, (23.1%); Depressive and Anxiety disorders (*Depression & Anxiety group*), $N = 225$ (21.6%); Bipolar disorder, $N = 19$ (1.8%); Schizophrenia, $N = 70$ (6.7%); and Other Psychotic disorders, $N = 93$ (8.9%). Data of the study group were first analyzed under the broader categories of depressive and anxiety disorders vs. schizophrenia and psychotic disorders, and then as separate diagnostic subgroups. The bipolar disorder subgroup was too small to attain statistical significance and was therefore not included in the analyses. For demographic data of subjects, see [Table 1](#).

2.3. Measures of compliance

The Israeli Ministry of Health (IMH) recommends, in addition to visits to the gynecologist (the ideal number of which is not specified in the IMH recommendations), that routine prenatal care should include the following: screening for genetic diseases (pre-conception or early during pregnancy); complete blood count, blood type, fasting glucose levels, screening for syphilis and a urine chemistry and culture (immediately after the first prenatal visit and before week 12); several ultrasound tests during pregnancy (during first weeks and at the 1st and 2nd trimester); maternal serum markers (e.g., alpha-fetoprotein, aFP); and an oral glucose tolerance test (OGTT, weeks 24–28) [16]. Utilization of prenatal care was assessed in our study with regard to the following: number of prenatal visits (NPV); OGTT and aFP. NPV is the main measure that was assessed in previous studies. Laboratory tests such as aFP and OGTT are part of prenatal care [1], but have not been previously assessed. Compliance with prenatal ultrasound and genetic tests was considered but not assessed in our study because undergoing these tests via private clinics has become very popular in Israel, so a crucial percentage of the data regarding ultrasound tests was unavailable to us. Compliance with prenatal laboratory tests (i.e. aFP, OGTT) was assessed using dichotomous variables (having done the test or not). We defined compliance with prenatal care visits as NPV within 4–10, considering 4 as the minimum adequate NPV for even extreme prematurity (22-weeks' gestation) according to the Kessner Index [17], and 10 as an adequate NPV above which negative outcomes have been described in the literature [11]. Because it is unclear what should be the minimal NPV for low risk women, we defined underutilization as absence of prenatal care visits (NPV = 0). Overutilization was examined using several criteria: (1) Exceeding 10 visits [11];

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