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| Supplementary Table 1. Data Extraction for Included Studies. |
| Title | Author | Year | Study Aim | Research Question | Study Setting | Population Demographics | Gestational Age | Sample Strategy/Size | Psychometric Measure of Anxiety Used | Study Design | Method of Data Collection | Ethical Issues | Method of Analysis (incl. control for confounders) | Study Findings | Relationship | Other Comments |
| Pregnancy anxiety, placental cortioctropin-releasing hormone and length of gestation | Ramos et al | 2022 | If change in pregnancy anxiety from early to late pregnancy were associated with length of gestation and if this is mediated by changes in pCRH..  If change in pregnancy anxiety was associated with nonlinear change in pCRH over the same period and whether nonlinear change in pCRH predicted length of gestation. e same period. | Not clear | Two urban healthcare sites in Los Angeles, California and Denver, Colorado, USA | Mean(SD) age= 30.33(5.95), Mean(SD) income= $28,121(26,479), 55.5% college or higher degree, 64.8% married, 81.1% white | Date of conception estimated by last date of menstrual period and pelvic ultrasound Length of gestation and preterm birth was determined and extracted from medical charts after birthMean(SD) week of gestation=38.91(2.08) | N=233 pregnant women were recruited through direct patient contact and brochures in OB/GYN practices and referral, at 12 weeks gestation | Pregnancy-Specific Anxiety Scale [PSA]Measured at each of the three prenatal study visits | Prospective longitudinal study (secondary data analysis of the Health Babies Before Birth study) | Assessed at T0 (prior to 16 weeks gestation) at at three timepoints during pregnancy: T1 (8-16 weeks gestation), T2 (20-26 weeks gestation), T3 (30-36 weeks gestation - interviews were conducted at each assessment assessing a number of psychosocial constructs (including anxiety)Information on health, pregnancy history, and current pregnancy complications were coded after birth from labour records | Excluded from the study if:substance abuse, HIV-positive, smoking, multiple gestations | Change in pregnancy anxiety was assessed by subtracting T1 anxiety by T3 anxietyA number of demographic and obstetric variables examined as potential confounders - only those identified as statistically significant from bivariate correlations were added to the model (early second trimester pregnancy anxiety, site, socioeconomic status, obstetric risk, history of pregnancy loss, weeks of gestation at the time of assessment, parity) - of these, only those that remained significant in the final model were retainedStructural equation modelling to determine the relationship between change in pregnancy anxiety and length of gestation via change in pCRH | Greater increases in pregnancy anxiety were associated with shorter length of gestation β= -0.534, SE β= 0.252, p= 0.034 - after adjusting for the effects of early 2nd trimester pregnancy anxiety, research site, socioeconomic status, and weeks of gestation at the 3rd trimester visit | Yes | Detailed analysis plan, controls for a wide range of confounders, change in pregnancy anxiety across trimesters is considered, did not assess prior or current clinical diagnoses of anxiety |
| Maternal Anxiety and Infants Birthweight and Length of Gestation. A sibling design. | Bekkhus et al | 2021 | Examine the effect of prenatal maternal anxiety on birthweight and gestational age, controlling for shared family confounding | Not clear | At routine ultrasound examinations, Norway | Majority aged 30-35 years, 732 attended College/University, 87,656 married, 41,316 nulliparous | Gestational age measured in days and extracted from MBRN (Medical Birth Registry of Norway)Mean(SD) gestational age= 39.5(1.72) | N=91,165 (12,480 sibling pairs) recruited during their first routine ultrasound examination | Short versions of two Hopkins Symptom Checklists (SCL-5 at 17 weeks' gestation; SCL-8 at 30 weeks' gestation) | Prospective longitudinal study | Completed questionnaires on anxiety levels and demographics in 17th and 30th weeks of pregnancyLink to the MBRN birth registry to extract medical information after birth | Not clear | Associations between prenatal maternal anxiety (measured across the 17th and 30th weeks) and birth outcomes were examined using linear regression with adjustment for shared-family confoundingConfounding variables were considered based on whether they could influence both prenatal anxiety and child outcomes - they were only included in the model if they were associated with anxiety and 1/2 outcomes (alcohol consumption during pregnancy, smoking in pregnancy, marital status, maternal education). The following were also controlled for (maternal age, parity, birth complications, child's sex, preeclampsia) | After adjusting for all confounders, maternal anxiety was not significantly associated with gestational age in the full cohort at 17 weeks but was at 30 weeks (B= -1.14, 95%CIs= -1.64, -0.64) and at both weeks compared to those not exposed and those exposed only once during pregnancy (B= -1.52, 95%CIs= -2.15, -0.89).In the sibling cohort, anxiety was only significantly associated with gestational age at 30 weeks after adjusting for shared family effects and control variables in all steps (B= -1.11, 95%CIs (-1.82, -0.4). | Yes | Did not control for diagnosis of anxiety, unshared environmental factors not taken into account, anxiety was self-reported |
| Do lifetime anxiety disorders (anxiety liability) and pregnancy-related anxiety predict complications during pregnancy and delivery? | Hoyer et al | 2020 | Examine the association of lifetime anxiety disorders and pregnancy-related anxiety and complications during pregnancy and delivery | Not clear | Outpatient settings, Dresden, Germany | 35% high school educated, 56.5% employed, 59.8% never married, 48.5% had one pregnancy, 58.2% zero previous prior deliveries | Preterm labour defined as labour prior to the 37th week of pregnancyPreterm delivery was defined as delivery before 37 weeks of gestation | N=533 pregnant women recruited at <12 weeks gestationThe participants for analyses depended on the number of participants with data on predictor variables (n = 306 for anxiety liability; n = 293 for pregnancy related anxiety) and the completeness of medical data | Pregnancy and Childbirth Related Fears questionnaire - German version | Prospective longitudinal study | Mothers were assessed through interviews, questionnaires, and medical records at seven different timepoints (3 during pregnancy) (T1: 10-12 weeks gestation; T2: 22-24 weeks gestation; T3: 35-37 weeks' gestation; T4: 10 days postpartum; T5: 2 months postpartum; T6: 4 months postpartum; T7: 16 months postpartum)14 of the most common medical complications in pregnancy were extracted from medical records (including preterm birth) - further corrobrated by maternal reports and interviews with mothersPreterm labour was confirmed via the health supplement interview at assessment T3 whilst preterm birth was extracted from medical records at T4 | Excluded if:Gestational age is >12 weeks, older than 40 years, multiple pregnancy, history of >3 spontaneous abortions/induced termination/stillbirths or infant impairment, invasive fertility treatment, severe physical disease/microsomia/maternal sketal maformation, substance abuse or heroin substitution in the last 6 months, severe psychiatric illness | Wald-Chi2 test conducted based on results of a multivariate logistic regression - if an association is significant, single univariate regression was conducted to see if it was associated with anxiety liability and pregnancy-related anxietyAdjusted models considered confounding variables, based on T1 interviews (maternal age, maternal BMI and maternal squared BMI, smoking status, socio-economic status, cohabitation with a significant other | After adjusting for confounding variables, there was no significant relationship between pregnancy-related anxiety and preterm labor/delivery - this was significant with preterm labour in the unadjusted model (OR=1.3, CI=1.02-1.7). | Not with pregnancy-specific anxiety after adjusting for confounders | Possibility of a Type 1 error due to the number of predictors in the model, only 11 of the participants had a preterm delivery |
| Association of antepartum depression, generalized anxiety, and posttraumatic stress disorder with infant birth weight and gestational age at delivery | Gelaye et al | 2020 | To evaluate the extent to which early pregnancy antepartum depression, generalized anxiety disorder, and posttraumatic stress disorder(PTSD)are associated with infant birthweight and gestational age at delivery among a cohort of pregnant women in Peru | Not clear | Women recruited were attending prenatal care at Instituto Nacional Materno Perinatal (INMP), Peru | Mean(SD) Age=27.9( 6.11), 47.2% >12 years of education, 82.2% married or living with partner, 48.2% nulliparous26.2% had antepartum depression, 32.6% generalised anxiety, 34.5% PTSD | Gestational age was based on the date of the last menstrual period and confirmed by an ultrasound performed during visits before 20 weeks' gestationPreterm delivery defined as delivery before the completion of 37 weeks of gestation6.3% gave birth preterm - mean(SD)gestational age at delivery in weeks=38.65(1.85) | N=4408 pregnant women at <16 weeks' gestation | Generalized Anxiety Disorder Scale 7-item [GAD-7] Score of >7 was defined as generalized anxiety disorder | Prospective cohort study | Structured interviews to elicit sociodemographic and reproductive characteristics - participants also completed depression, anxiety, and PTSD measures Outcome data obtained from linked medical records | Not clear | Multivariable linear and logistic regressions Included confounders decided a priori, or those who changed the model by more than 10% (maternal age, parity, early pregnancy BMI, infant sex). Additional confounders included difficulty paying for the basics (hard vs not very hard) | The odds of preterm birth was not elevated for women reporting generalized anxiety (aOR= 1.25, 95%CIs 0.97-1.62)Women who reported generalized anxiety delivered infants 0.15 weeks earlier on average (95%CI: 0.27 to -0.04, p=0.010) compared to women reporting no generalized anxiety | Yes - however preterm birth was not associated with anxiety, but there are increased odds of delivering earlier | Did not clinically diagnose anxiety, only 6.3% of the sample gave birth preterm |
| Pregnancy anxiety and preterm burth: The moderating role of sleep | Tomfohr-Madsenet al | 2019 | Replicate previous findings showing subjective and objective sleep assessment and the related outcomes of gestational length and birth and preterm birthInvestigate if sleep variable moderated the relationship between pregnancy anxiety and gestational length | Not clear | Recruited in Calgary and Edmonton, Alberta, Canada | Mean(SD) Age= 31.42(3.82), 48% university degree, 55% annual household income of £100,000, 79.4% white, 50% pregnant with their first child, 98% married or cohabiting | Gestational age at each assessment was determined based on last self-reported menstrual period and confirmed by at least one ultrasoundPreterm birth classed as <37 weeks gestationMean(SD) gestational age=39.17(1.68) | N= 290(267 completed both measures) recruited at <22 weeks gestation Participants were enrolled from a substudy of women in the Alberta Prenancy Outcomes and Nutrition (APrON) study | Pregnancy Related Anxiety Scale [PrAS] | Prospective longitudinal study | Mothers assessed at two timepoints during pregnancy (T1- 22 weeks gestational age (Mean(SD)= 15.04(3.55)); T2 - 32 weeks (Mean(SD)= 32.44, SD= 0.99)Anxiety measured using self-report questionnaireGestational age was taken from medical records | Excluded if they:were younger than 16 years, unable to answer questions in English, planning on moving away from the region, used steroids, smoked, consumed alcohol or "street" drugs, known pregnancy or fetal complications, illness during data collection, multiple pregnancy | Unadjusted bivariate associations between average pregnancy anxiety and sleep during pregnancy and birth outcomes were evaluated using Pearson's correlationsHierarchical linear regression models were conducted with pregnancy anxiety predicting infant gestational length at birth correcting for a number of covariates with known associations to PTB (maternal age, education, ethnicity, gestational hypertension, gestational diabetes, household income, parity, prepregnancy BMI) | After adjusting for covariates, higher pregnancy anxiety was associated with shorter gestational length (β= -.82, SE= .26, p= .002, ΔR2 =.03) and a higher risk of preterm birth (β= 2.15, SE= .79, p=.007, OR= 8.54) | Yes | Did not control for prior PTB, sample highly educated, high SES, predominantly White women |
| Pregnancy anxiety predicts shorter gestation in Latina and non-Latina white women: The role of placental cortiocotrophon-releasing hormone | Ramos et al | 2019 | To examine placental CRH as a physiological mediator of the association between pregnancy anxiety and gesta-tional length in Latina and non-Latina White women to replicate evidence of associations between pregnancy anxiety, placental CRH and gestational length; to test whether placental CRH levels or changes mediate effects ofpregnancy anxiety on gestational length; to examine ethnic differences in pregnancy anxiety, placental CRH, and gestational length; and to explore whether the effects of pregnancy anxiety on gestational length as mediated by placental CRH vary by ethnicity | Not clear | Recruitment at twolarge medical centresCountry is not explicitly stated | Mean(SD) age= 30.01(5.44), predominantly married to the baby's father (76%) or cohabiting with him (15%)Compared to non-Latina White women, Latina women were significantly younger, had lower household income and less education, were more likely to have had a prior birth and be married or cohabiting with the baby's father - no significant differences between groups in terms of medical risk | Gestation in weeks was estimated during early prenatal visits and confirmed by reported last menstrual period and confirmed by pelvic ultrasound | N=337; Latina (n= 107) and non-Latina white (n= 230) women | Pregnancy-Related Anxiety Scale [PrAS] | Prospective longitudinal study | Women were interviewed at three timepoints in pregnancy separated by six weeks (T1 mean(SD) weeks= 19(0.85); T2 mean(SD) weeks= 25(0.85); T3 mean(SD) weeks= 31(0.80)Birth outcomes and maternal risk factors were obtained from medical records | Exclusion criteria: current tobacco,alcohol, or drug use , and medical conditions involving dysregulated neuroendocrine, cardiovascular, heptic, or renal fucntioning | All analyses statistically controlled for covariates (years of completed education, total household income adjusted by household size, age at study entry, parity, medical risk factors) and gestational week at the time of data collection for the placental CRH and pregnancy anxiety variables Mutiple imputation was used for missing dataEight multiple regressions were used - gestational length was regressed on pregnancy anxiety at each of the three time points during pregnancy (19, 25, 31 weeks)  | After applying an experiment-wise Bonferroni correction, the interaction of ethnicity with T1 (b=-0.99, SE=0.35, F=8.01, p=.005) and T3 (b=-1.14, SE=0.39, F=8.35, p=.004) pregnancy anxiety as predictors of length of gestation were significantWhen comparing the effects of T1 and T3 pregnancy anxiety, a significant effect of T3 anxiety was found in Latinas only, whereby one standard deviation increase in anxiety at 31 weeks is associated with 0.492 weeks shorter gestation after adjusting for covariates (b=-0.93, SE=0.30, F=9.62, p=.002, βx=-.492)  | Yes - but is more prevelant for Latina women in later trimester | Sample had to speak English so is not representative of all Latina women, relatively small sample size, not clear how or where participants were recruited, week of gestation at recruitment not clear |
| Mood state at the beginning of the pregnancy and its influence on obstetric and perinatal outcomes | Gonzalez-Mesaet al | 2019 | Ascertain the prevalence of depressive disorders and anxiety at the beginning of pregnancy, studying possible associated factors and assessing the influence of mood disorders on perinatal and obstretric outcomes | Not clear | First pregnancy medical visitCountry is not explictly stated | Mean(SD) age=31.8(5.79), 47.8% nulliparous, 38.7% one previous child, 7% at least one previous misscarriage, 45% single, 30.9% had a baccalaureate degree, 56.4% employed | Mean(SD)gestational age=38.5(1.4) | N=145 recruited via cosecutive sampling between 9-12 weeks of pregnancy | State Trait Anxiety Inventory (Spanish version)Low anxiety= score of between 0-30; moderate anxiety= 30-44; high anxiety= above 45 | Prospective observational study | Questionnaires completed via self-reportDetails about obstetric and neonatal outcomes were obtained from medical history | Pregnant women with multiple pregnancies and those who did not speak Spanish were excluded from the analysis | Correlations were conducted between state anxiety scores and duration of pregnancyMultiple linear regression was conducted using a backward stepwise regression, initially including all sociodemographic, emotional, and health related variables that had shown a significant association to foetal weight at delivery in bivariate analysis - this was also used to predict gestational age at delivery | There was noassociation between anxiety scores and prematurity | No | Statistics not given for non-significant association, not clear which country participants were recruited from, confounding variables are mentioned in-text but are not tabulated in the results so are slightly unclear |
| The association between pregnancy-specific anxiety and preterm birth: a cohort study | Khalesi et al | 2018 | Determine the association between pregnancy-specific anxiety and preterm birth in pregnant women | Not clear | Prenatal clinic of Al-Zahra hospital in Raht, Iran | Mean(SD) age=26.6(2.1), predominantly housewives (78.36%), diploma educational level (47.11%), nulliparous (50.96%)  | Gestational length during pregnancy confirmed by ultrasoundDeliveries sooner than the 37th week of pregnancy were considered pretermMean(SD) gestational age at delivery= 38.5(1.4) | N=208 pregnant women who were referred to the prenatal clinic | Pregnancy Specific Anxiety ScaleAt 8-12 weeks, 20-28 weeks, and 30-38 weeks they completed the scale  | Prospective cohort study | Self-report questionnaire for anxiety in each trimesterResearchers present at birth to record time of delivery  | Excluded if they:History of preterm delivery, history of abortion,stillbirth or infertility, any diagnosed complications of pregnancy (incompetent cervix, history of having any cardiovascular, respiratory, hematologic, renal, liver, infectious and endocrine diseases and history of diabetes or hypertension) | General linear model repeated measures tests used to examine variations in anxiety | Change in pregnancy-specific anxiety was significantly associated with preterm birthSecond trimester pregnancy specific anxiety was not associated with preterm birth, but third trimester was associated with preterm birth | Yes | Small sample size, predominantly housewives, potential issue with statistics table |
| Is there an association between maternal anxiety propensity and pregnancy outcomes? | Ravid et al | 2018 | Evaluate the association between anxiety propensity and pregnancy outcomes | Not clear | Helen Schneider Hospital for Women of the Rabin Medical Center, Israel | Anxiety Prone:Mean(SD) age= 31.89(4.81), predominantly spontaneous labour, 15 years of education, living in an urban area, employedNot anxiety prone:Mean(SD) age=32.06(5.12), predominantly spontaneous labour, 15 years of education, living in an urban area, employed | Gestational age during pregnancy was calculated by the last menstrual period - this was adjusted to crown-rump length assessment if there was a 7-day or more gap between the twoPreterm birth was defined as prior to 37 gestational weeksMean(SD) gestational age:Anxiety prone(38.66(2.31))Not anxiety prone(38.23(2.17)) | N=512 pregnant women at any gestational age recruited through convenience sampling | State Trait Anxiety Inventory (Hebrew version)A score of 38 or above was chosen as a cut-off to class women as "anxiety-prone" | Prospective observational study | Women filled out demographics and STAI by self-reportData collection continued until delivery to collect outcome data | Excluded if: History of any medically diagnosed mental or psychological disorders, language limitation preventing independent completion of questionnaires, use of psychotropic agents, mood stabilisers, anxiolytics, or antidepressant medications before and/or during pregnancy, any fetal genetic or structural malformations  | Participants divided into two groups (anxiety prone vs. not anxiety prone)Independent samples t-tests and chi-square were used to compare continuous and categorical differences | There was no statistically significant difference in preterm birth in women who were anxiety prone vs. not anxiety prone (p=0.87) | No | No control for confounders (significant differences between demographics are tabulated), no information on gestational age at recruitment, excluded participants with a history of mental disorders |
| Association of panic disorder, generalized anxiety disorder, and benzodiazepine treatment during pregnancy with risk of adverse birth outcomes | Yonkers et al | 2017 | To determine whether panic disorder or generalized anxiety disorder in pregnancy, or medications used to treat these conditions, are associated with adverse maternal or neonatal pregnancy outcomes | What is the possible association of anxiety disorderswith maternal and fetal outcomes? | Yale University School of Medicine, and 137 collaborating hospitals and private practices throughout Connecticut and Southern Massachusetts, USA | Mostly 25-34 years of age (56.9%), White (73.7%), >16 years of education (56.6%), 7.8% histor of preterm birth | Pregnancy dating used an algorithm that prioritised ultrasonography results prior to 18 weeks and, if unavailable, date of the last menstrual period was usedBirth considered preterm if it occurred before 36 weeks and 6 daysOutcome data extracted from medical records | N=2654 women were recruited before their 17th week of pregnancy through convenience sampling (data on birth outcomes available for 2634) | World Mental Heath Composite International Diagnostic Interview v2.1 administered prior to 17 weeks gestation and reinterviewed at 28 weeks gestation via telephone - required 1 month rather than the usual 6 months of symptomsAlso administered the Edinburgh Postnatal Depression Scale (including the anxiety subscale) | Cohort study | Telephone interviews to administer World Mental Health Composite Interview v2.1 and some demographic informationOutcome data extracted from medical records | Excluded if:Multifetal pregnancy, were receiving insulin or treatment for diabetes, did not speak English or Spanish, did not have access to a telephone, had plans to relocate or voluntarily terminate the pregnancy | For missing data:If a woman met criteria for a psychiatric diagnosis at any point in pregnancy, she was classified as positive for that disorder - if a woman had partial data and was negative for a disorder she was considered negative during pregnancyUsed logistic regression and built separate unadjusted and adjusted models for each outcome - all adjusted models included main exposures (panic disorder, GAD, benzodiazapene use and SRI use) and possible confounders (heavy alcohol use, illicit substance use, previous preterm birth, age, race/ethnicity, educational level, BMI)When modelling preterm birth, previous preterm birth was adjusted for | Adjusted models showed no significant associations between GAD and preterm birth <28 weeks gestation (OR= 1.21(95%CIs= 0.70-2.12))  | No | Detailed analysis plan, controls for a wide range of confounders, sample may not be representative  |
| No association between antenatal common mental disorders in low-obstetric risk women and adverse birth outcomes in their offspring: results from the CDS study in Ghana and Cote D'Ivoire | Bindt et al | 2013 | To explore the association between antenatal depression and anxiety symptoms and birth otucomes in a low-obstetric risk sample of mother/child dyads in Ghana and Côte d'Ivoire | Not clear | Recruited at two large hospitals (the Komfo Anokye Teaching Hospital, Ghana and the Abobo Community Hospital, Côte d'Ivoire) | Mean(SD)Age= 29.1(5.5), 41.3% from Ghana 58.7% from Cote D'Ivoire, 39.9% middle SES, 24.2% previous pregnancy complications  | Gestational age during pregnancy estimated according to second trimester ultrasound screeningPreterm birth defined as <37 0/7 weeksMean(SD) gestational age at birth= 39.6(1.9) | N=717 women in their third trimester recruited through opportunity sampling in their hospital clinic | Generalized Anxiety Disorder Scale 7-item A threshold score of >10 had a sensitivity of 89% and a specificity of 82% and was used for case classification | Prospective Cohort Study | Self-report questionnaires for anxietyMedical data was extracted after birth | Excluded if:Under 18,multiple pregnancy,chronic physical disease, or other risk factors likesevere complications during pregnancy due to diabetes, hemorrhage, hypertension, and preeclampsia | Predictors of preterm birth were analysed using univariate and multivariate linear regressionsMultivariate regressions were conducting to control the simultaneous confounding effects of possible predictors (SES, maternal age, maternal hemoglobin, previous pregnancy complications, maternal intermettient preventive treatment in pregnancy, maternal malaria treatment, maternal diarrhea, maternal fever, maternal UTI, maternal vaginal infection, maternal HIV infection, matenral height, and delivery by caesearan section added to the model | Anxiety was not a significant predictor of preterm birth OR=1.8, 95%CIs= 0.6 to 5.5, p=0.29 | No | Only measured anxiety during the third trimester, lack of statistical power |
| The effects of maternal major depression, generalized anxiety disorder, and panic disorder on birth weight and gestational age: a comparative study | Uguz et al | 2013 | Compare the infants of mothers with major depression, generalized anxiety disorder, and panic disorder in terms of gestational age and birth weight at delivery | Not clear | Women admitted to:Psychiatry and Neonatology Outpatient Clinics of Meram Faculty of Medicine of Necmettin Erbakan University, Konya, TurkeyPsychiatry Outpatient Clinic of Faculty of Medicine of Seluck University, Konya, TurkeyPerinatal Mental Health Outpatient Clinic of Bakirkoy Research and Training Hospital, Istanbul, Turkey | N=22 women with major depression (MDD), n=19 with panic disorder (PD), n=22 with generalised anxiety disorder (GAD), n=25 healthy controls)Mean(SD) Age=30.09(4.78), all were married (100%), approximately 50% completed primary school, majority unemployed (81.1%) | Mean(SD) gestational age MDD= 38.12(1.33)Mean(SD) gestational age GAD= 30.68(4.03)Mean(SD) gestational age PD= 37.10(2.56)Mean(SD) gestational age healthy controls= 39.56(1.32) | N= 90 women in their 36th gestational week of pregnancyRecruitment strategy not explicitly clear | Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition | Cohort study | Sociodemographic characteristics obtained from outpatient clinics and then psychiatric interviews were performed to determine whether a psychiatric disorder existed during the previous pregnancy | Excluded if:a history of medical illnesses or pregnancy related complications, any foetal malformation, a maternal infection which could negatively affect fetal growth, a history of bipolar affective disorder, schizophrenia, or related psychotic disorders, smoking or alcohol consumption during pregnancy, the existence of comorbidity between depressive and anxiety disorders, any psychiatric treatment during pregnancy for the psychiatric diagnosis | Categorical and continuous variables in the study groups were analysed with chi square and one-way ANOVAs | There was no statistically significant difference between the control group and the GAD group in terms of gestational age (p= 0.154) | No | Did not controlfor confounders, used clinical diagnostic tool of anxiety, not clear how participants were recruited |
| Relation between positive and negative maternal emotional states and obstetrical outcomes | Hernandez-Martinez et al | 2011 | To investigate whether maternal anxiety and emotional stability were related to gestational age at birth, birth weight, and type of deliveryTo explore if positive and negative emptional states are related to obstetric complications | Is there a moderate relationship between maternal anxiety and emotional stability and the following obstetric outcomes: gestational age at birth, type of delivery, and newborn birth weight? | Unit of Obstetrics and Gynecology of the Sant Joan University Hospital of Reus, Spain | Mean(SD) Age= 31.70(4.33), Mean(SD) Parity= 1.58(0.66), 62% normal delivery | Gestational age was verified by ultrasound in obstetrical examinationsMean(SD) weeks of gestation= 39.21(1.36). | N=188 mother-infant dyads at no more than 11 weeks' gestation, approached via gynecologists at the hospital | State Trait Anxiety Inventory (Spanish Version) | Prospective cohort study | Self-reported anxiety in the immediate postpartum (but asked about feelings during pregnancy)Obstetric variables were extracted from medical records | Exclusion criteria included: diabetic, recently had major gastric surgery, pregnany with twins, miscarried, terminated their pregnancy due to major foetal malformations, change of residence, gave birth in another hospital, did not answer anxiety-scale questions | Women were divided into groups according to their anxiety score percentiles (low=scores < percentile 33; medium=scores between percentile 33 and 66; and high=scores >66 percentile)STAI was further split into its four factorsMultiple linear regression models fitted to examine confounders (demographics) with gestational age and birth weight - the stepwise method for selection of variables was used, and the criteria used for selection were to enter probability (p) of F<=0.050, and to remove probability (p) of F>=0.100 (maternal age at delivery, prenatal smoking, prenatal alcohol consumption, child gender, parity, birth weight | STAI Factor 1 (state of nervousness, tension, anxiety,and restlessnes) was significantly associated with gestational age at birth (B=0.145, t= 2.250, p= 0.026) after the addition of confounders in the model (age, prenatal smoking and prenatal alcohol use, gender) | Yes | No very premature births in the sample, small sample size that lacks power |
| Women with high-risk pregnancies: maternal anxiety and its relationship to infant health status | Sopajaree | 2000 | Examine changes in prenatal anxiety over time during a high-risk pregnancy, determine peak levels of anxiety, and to examine the relation of maternal characteristics and patterns of anxiety to infant health status at birth | How does maternal anxiety change over time in women with high-risk pregnancies?At what point during pregnancy do women experience peak levels of anxiety? What is the impact of maternal characteristics (parity, maternal age, family income, education, and gestation type) on maternal anxiety patterns?How do patterns of maternal anxiety during high-risk pregnancy correlate with infant health status at birth? | Current study is a secondary data analysis - primary data was collected from a prenatal clinical in Pennsylvania, USA | Mean(SD) Age=26.7(6.42), 35.2% lower than High School education, 86.1% single, 93.3% Black ethnicity  | Gestational age at birth was measured according to the Ballard ScoreMean(SD) gestational age=37.0(3.21) | N=165 women recruited at their first prenatal visit in the first trimester - women with GDM and those diagnosed with their first preterm labour episode were recruited at the time of diagnosis, which was usually after 20 weeks gestation | MAACL-state form - only anxiety subscale used for the study analysis | Longitudinal study (secondary data analysis) | Self-report for anxietyObstetric variables collected from medical records | Exclusion criteriaincluded: pregnancy-induced hypertension, other criteria for a high-risk pregnancy | Partial correlations and hierarchical multiple regressionsPartial correlations were computed in order to examine associations whilst controlling for gestation type | No significant correlation between anxiety and preterm birth | No | Small sample size, high-risk sample only |
| Correlation between maternal anxiety with corticotropin releasing hormone in pre-term labor and term labor | Wulandari et al | 2018 | To investigate the differences in the levels of maternal anxiety and corticotropin-releasing hormone (CRH) and to explore the correlation between maternal anxiety levels and CRH levels in cases of preterm birth and term birth | What are the differences in the levels of maternal anxiety between mothers who experience preterm birth (PTB) and mothers who experience term birth?What are the differences in the levels of CRH between mothers who experience preterm birth and mothers who experience term birth?Is there a correlation between the levels of maternal anxiety and CRH in mothers who experience preterm birth? | Dr Hassan Sadikin Hospital and associated district hospitals, Indonesia | Term Birth Group:Mean(SD) Age= 27.7(8.0), 46.7% middle level of education, 73.3% unemployed, 70% multiparousPreterm Birth Group:Mean(SD) Age= 27.6(5.9), 66.7% middle level of education, 66.7% unemployed, 66.7% multiparous  | Gestation during pregnancy was taken from the date of the last menstrual period>28 - 34 weeks gestation were admitted into the preterm group>37 weeks for the term group | N=60 women who were in partuient labor | Zung Self-Rating Anxiety ScoreScore was then divided into:minimal (<45), mild (45-59), moderate (60 - 74), severe (>75)Email to the authors clarified that this measure was taken during pregnancy | Case control study | Self-reported anxietyOther obstetric and health data extracted from history taking | Excluded if:severe anxiety was found after the anxiety assessment, congenital malformation, intrauterine growth restriction | Mann-Whitney U | There was a significant difference between anxiety levels between the term and premature group (p<.001), with the premature group having higher levels | Yes | Small sample size, small number of women gave birth preterm, no consideration for confounders |
| Association between maternal anxiety and preterm delivery in Lima, Peru | Serrano-Villa et al | 2016 | Determine the association between maternal anxiety during the third trimester and preterm birth | Not clear | Hospital Nacional Docente Madre-Niño San Bartolomé, Lima, Peru | Median(Range)Age= 27(21-31), 68.1% cohabiting, 58% second child | Preterm birth classified as <37 weeks gestation | N=247 women recruited during their third trimester (28-35 weeks' gestation) using non-probalistic, consecutive sampling | State Trait Anxiety Inventory (Spanish Version) | Prospective cohort study | During the first clinic visit during prenatal check-up, sociodemographic data was recorded as well as the anxiety measureIn the second visit, perinatal medical records and obstetric birth logs were extracted | Exclusion criteriaincluded: under the age of 18, ,illiterate, with foetuses with a diagnosis incompatible with extrauterine life, diagnosis/treatment of depression or bipolar disorder, did not give informed consent | Bivariate analysis carried out using Mann-Whitney UChi-square and Fisher's exact test were used to assess the relationship between categorical variablesMultivariate analysis conducted using Poisson regression, adjusted for variables such as preeclampsia, gestational diabetes, urinary tract infection/vulvovaginitis, age | In bivariate analysis, no significant association was found between state/trait anxiety and the development of preterm birthState anxiety was not significantly associated with PTB (adjRR= 1.13, IC 95%= 0.50-2.55, p=0.765) and neither was trait anxiety (adjRR= 0.90, IC 95%= 0.42-1.92), p= 0.782) after adjusting for confounders | No | Small sample size, only third trimester anxiety, did not consider clinical diagnoses of anxiety |
| Trait anxiety in pregnancy women predicts offspring birth outcomes | Hosseini et al | 2009 | To characterise the relationships between trait anxiety and symptoms of women during their pregnancies and birth outcomes of their offspring | Not clear | Urban,hospital-based prenatal clinicCountry not explicitly stated | Mean(SD) age=23(4), 51 (0.02%) African American,mean(SD) education in years=12(1.4) | Gestational age determined using the Dubowitz scaleMean(SD) gestational age= 39.7(2.2) | N=763 women recruited during their fourth prenatal month (first trimester) | Anxiety subscale of the State Trait Personality Inventory (STPI)Assessed how study participants generally felt since the previous assessment, and in the case of the first trimester assessment, how they had felt since becoming pregnant | Secondary analysis of a longitudinal cohort study (Maternal Health Practices and Child Development Project) | Women were recruited during their fourth prenatal month and subsequent assessments were obtained at the seventh prenatal month (second trimester) and at delivery (third trimester)Birth outcomes measured by study personnel or from medical records | Not clear | Hierarchical regressionConfounders identified using univariable analysis between each covariate and third trimester anxiety:demographic, social, substance use, medical, and psychological | After controllingfor confounders, anxiety in the first and second trimester did not significantly predict gestational ageHowever, third trimester anxiety significantly predicted gestational age R2change due to anxiety= 0.009, unstandardised b=-0.23 weeks, p<0.01Gestational age wsas significantly shorted for offspring of mothers who experienced severe anxiety during all trimesters, as compared with those who did not report severe anxiety at any trimester (F(3, 684)= 2.80, p<.05) | Partially - only in the third trimester or in the first and second trimester only in women with severe anxiety | Reported third trimester anxiety after delivery, considered anxiety across the trimesters |
| The association between prenatal anxiety and spontaneous preterm birth and low birth weight | Nasiri et al | 2010 | Determine the effect of prenatal anxiety on preterm delivery and low birth weight in Babol, Northern Iran | Not clear | Health centres affiliated to Babol University of Medical Sciences, Iran | State Anxiety Score <45:Age 18-45 (92.1%), high school educated (42.4%), housekeeper (92.7%)State Anxiety Score >45:Age 18-45 (93.5%), secondary school educated (38.5%), housekeeper (95%) | Gestational age during pregnancy confirmed via ultra sonographic examination before 20 weeks Spontaneous preterm birth defined as less than 37 completed weeks of pregnancy | N=600 participants recruited at >12 weeks gestation  | State Trait Anxiety Inventory (Iraninan Version) | Prospective cohort study | Self-administered questionnaireMedical characteristics extracted via obstetric records | Excluded if: chronic diseases, psychologist disorders, previous preterm birth, multiple gestation, placenta previa, cerclage for cervix incompetence and bad events during the last three months  | Cut off score of >45 was considered for both state and trait anxietyChi-square, t-tests and logistic regression were used | Mean state anxiety scores were significantly higher in women who had given birth preterm comparative to term (p<0.001), as were trait anxiety scores (p<0.001).High state anxiety scores were associated with an increased risk of preterm delivery (RR= 3.1, 95%CIs= 2.05-4.7) | Yes | No considerationfor confounders (although did consider significant differences in demographic variables), not clear how women were recruited |
| Impact of prenatal stress, social support, anxiety, and acculturation on pregnancy outcomes in sample of hispanic women | Reyes & Upvall | 2016 | To determine whether the variables of prenatal stress, social support, anxiety, and acculturation are predictive of pregnancy outcomes in a sample of Hispanic women | Is acculturation associated with life stress, anxiety,and social support?; Is acculturation associated with poor birth outcomes?; Are behavioral factors associated with life stress,anxiety,and social support?; Is anxietyassociated with poor birth outcomes?;Is life stress associated with poor birth outcomes?; Is social support associated with poor birth outcomes?; Are smoking and alcohol/drug use associated with poor birth outcomes? | Hospital obstetrical and gynecological clinic in the Eastern USA | Mean(SD)age=27.49(6.10), 100% Hispanic, 50% less than 12th grade education, all considered first generation immigrants | Gestational age measured in weeks using the clinical criterion of 37 weeksMean(SD) gestational age=38.73(1.59)  | N=55 pregnant women between 32-40 weeks' gestation recruited via convenience sampling | State Trait Anxiety Inventory | Cohort study (although listed as cross-sectional, women were recruited during pregnancy and obstetric data collected after birth) | Participant self report for measuresMedical records reviewed to obtai medical and obstetrical information | Excluded if: prior obstetric complications, chronic/serious illness, HIV exposure | Pearson's correlations and t-tests | State anxiety wasnot significantly related to preterm delivery t= 0.76, p=.454State anxiety was not significantly related to gestational age at birth r= -.07, p=.640 | No | Very small sample size and a small percentage gave birth preterm (5 women in the whole sample), no consideration of potential confounders or significant differences between groups in terms of demographics |
| Relationship between prenatal anxiety and perinatal outcome in nulliparous women: a prospective study | Bhagwanani et al | 1997 | Prospectively determineanxiety levels in normal pregnant women and to examine its relationship with perinatal outcome and its potential value in prenatal care | Not clear | Prenatal clinic at MetroHealth Medical Center, Cleveland Ohio, USA | Mean age=20.9, 64.6% White, 27.4% African American, 54.5% for <12 years, 76.1% single | Gestational age during pregnancy was estimated by best clinical estimate based on last menstrual period, early uterine size, ultrasound examination, and Dubowitz assessment of the newborn | N=88 pregnant women recruited between 8 and 28 weeks of gestation were approached for participation | State Trait Anxiety Inventory | Prospective study | Self-report of anxiety at recruitment, and then repeated after minimum intervals of 6 weeksOutcome data was extracted from medical records | In-person psychiatric evaluation was carried out once during pregnancy to rule out psychopathology according to the criterial in the DSM-111RExcluded if: positive drug screen, suffered from paranoid and suicidal ideation, moved out of town, otherwise lost to follow-up | Pearson's and Spearman's correlations were computed for all continuous and categorical variables, and ANOVA were performed for all categorial vs. continuousGestational age was analysed as a continuous as well as dichotomous variable  | Anxiety (dispositional and stable) and gestational age (continous) were positively correlated (p<.05)The mean values for all of the anxiety scores were lower in seven women who had preterm delivery (p=.05) for A-T (dispositional and stable) anxietySignificant association between low anxiety (A-T) in the second trimester and preterm delivery (p=.013) as well as the third trimester (A-S) (p=.019) | Yes - but as anxiety increases, so does week of gestation | Small sample size, data did not control for gestational age, significant differences between outcomes and demographics are mentioned, and controlling for some variables is mentioned in the results but it is unclear |
| Mood instability, depression, and anxiety in pregnancy and adverse neonatal outcomes | Li et al | 2021 | Examine the relationship among antenatal mood instability, depression, and anxiety and neonatal outcomes | Not clear | Not clear (references another publication) | Mean(SD) age=29.0(4.85), 38% first-time mothers, 91% living with a partner, 95%had a Grade 12 or higher education, and 90% had a family income of at least $40,000 | Preterm birth classed as <37 weeks gestation32 (6%) of the sample gave birth preterm (10% of the sample had missing values for this variable) | N=555 women  | EPDS Anxiety Subscale (items 3, 4 and 5)>6 is indicative of clinically relevant anxiety | Prospective cohortSecondary data analysis from the Feelings in Pregnancy and Motherhood study | Anxiety symptoms were measured at T1 (17.4 ± 4.9 weeks) and T2 (30.6 ± 2.7 weeks) via self-reportNeonatal outcomes obtained from mothers and linked with discharge records | Not clear | Cross-tabulated nine maternal variables (depression, anxiety, mood instability, alcohol use, smoking, stress, partner support, parity, exercise) with five neonatal outcomes (Apgar 1 min score <7, Apgar 5 min score <7, pre-term birth (<37 weeks), low birth weight (<2.5kg), small for gestational age) - Chi-square or Fisher's exact test was used to examine their associationsFor each significant association, a logistic regression model was created that adjusted for maternal age and marital status - this was performed with complete cases and multiple imputationsPreterm birth dichotomised into PTB (<37 weeks) and normal term birth (> 37 weeks) | Preterm birthwas not significantly associated with anxiety scores of above or below 6  | No | White high SES women, low sample size, low statistical power |
| Percieved stress may mediate the relationship between antenatal depressive symptoms and preterm birth: a pilot observational cohort study | Lalani et al | 2021 | To determine whether changes in pregnancy-related anxiety and depressive symptoms during pregnancy influence the risk of preterm birth amongst Pakistani women, explore whether percieved stress moderates or mediates this relationship, and examine the relationship between the various components of pregnancy-related anxiety and preterm birth | Not clear | Four centres of Aga Khan Hospital for Women and Children, Pakistan | 36.1% college or University level educated, 30.5% Muhajir ethnicity, 37.8% married for over five years, 24.1% two or more children, 79.5% homemaker | Week of gestation was determined by last menstrual cycle based on self-report at the time of recruitmentPreterm birth defined as birth prior to 37 weeks' gestation | N= 249 women recruited between 12-19 weeks of gestation9.6% of the sample gave birth preterm | Pregnancy-Related Anxiety Scale  | Prospective cohort studySecondary analysis of data | After recruitment, women scheduled for a visit and a follow-up 10 weeks after recruitmentSociodemographic characteristics assessed at first visit in the early second trimester (12-19 weeks' gestation) alongside psychological measures which were measured again during the late second trimester (22-29 weeks' gestation)Birth outcomes extracted from women who returned for delivery at recruitment site | Excluded if: women self-reported pregnancy comorbidities e.g., hypertension and diabetes mellitus | Change in anxiety scores calculated by subtracting first visit score from the secondPaired t-tests, Pearson correlations and hierarchical multiple regressionSix subscales of pregnancy-related anxiety split to see if they predicted preterm birthModels were also adjusted for percieved stress and significant covariates  | After adjusting for education and family type, change in pregnancy-related anxiety was not a significant predictor of preterm birth (OR=1.1, 95%CIs=0.97-1.17, p= 0.167)In terms of the subscales of the anxiety scale, overall change in pregnancy-related anxiety was not associated with preterm birth - 'Concerns/worries about Fetal Health' was significant in the model with only predictors (OR=1.4, 95%CIs=1.03-1.78, p=.031), but was not significant when adjusted for percieved stress and covariates (OR=1.3, 95%CIs=0.97-1.72, p=.078)  | No | Lots of predictors in the model, small sample size, low rate of preterm birth in the sample |
| Neighbourhoodsocioeconomic status modifies the association between anxiety and depression during pregnancy and preterm birth: a Community-based Canadian cohort study | Adhikari et al | 2020 | To examine theassociation of anxiety alone, depression alone, and the presence of both anxiety and depression with preterm birth and further examine whether neighbourhood socioeconomic status (SES) modifies this association | Not clear | Calgary, Alberta,Canada | 79.2% <35 years of age, 94.9% married, 79.0% White/Caucasian, 71.5% completed postsecondary education, 52.5% income between $70,000 and <$100,000  | Births that occurred before 37 weeks of gestation were defined as PTB (both spontaneous and iatrogenic included)Preterm birth was measured at 4 months postpartum, based on maternal recall of week of gestation at deliveryn=356 had of the overall sample had a preterm birth (7.3%) | N= 5297 comprised from two datasets of prospective cohort studies recruited via community-based and non-stratified samplingAnxiety was measured at <27 weeks' in one study, and at <25 weeks in the other; they were additionally measured between 27-42 weeks for one study, and 34-36 weeks for the other | EPDS Anxiety Subscale (items 3, 4 and 5)A score of >6 indicative of clinically relevant anxiety | Prospective cohort studySecondary data analysis of the Alberta Pregnancy Outcomes and Nutrition (APrON) and All Our Families (AOF) studies | Self-reported anxiety | None stated | Bivariate analysis was used to identify variables associated with preterm birth as well as anxiety and/or depression - the significantly associated variables were parity, ethnicity, and BMIA multivariable logistic regression model examined the association between anxiety and/or depression and PTB - the model also included parity, ethnicity, BMI, maternal age, smoking, social support, maternal education and household total income variables (based on conceptual understanding) | After adjusting for parity, ethnicity,BMI, age, smoking, social support, maternal education, and household total income, anxiety alone was not significantly associated with PTB (aOR=0.8, 95% CI 0.6 to 1.5) | No | High SES sample |
| Risk of preterm birth and newborn low birthweight in military women with increased pregnancy-specific anxiety | Weis et al | 2020 | Determine the impact of pregnancy-specfic anxiety and depression on preterm birth and low birthweight within a military population | Not given | A large military community in the United States | Mean(SD) age= 28.72 (5.00), 60% white non-hispanic, 51% some college education, 91% married, 60% only husband on active duty | Gestational agewas obtained from the inpatient maternity and neonatal records, which were verified with the last menstrual period and first trimester ultrasoundPTB was defined as birth before the 37th week of gestation | N=246 women in their first trimester of pregnancy | Lederman Prenatal Self-Evaluation Questionnaire - Short Form (PSEQ-SF) | Secondary analysis of a randomised control trial Mentors Offering Maternal Support (M-O-M-S) (treated as longitudinal as the results of the current study are based on the overall sample population and not on group assignments) | Anxiety measured by self-report at three points during pregnancy (upon entry (M=8.91, SD=2.34), second (M=19.73, SD=3.30), and third(M=30.43, SD=2.79) trimesters Birth outcomes were obtained from the inpatient maternity and neonatal outcomes | None stated | Individual slopes for each of the seven prenatal anxiety scales were calculated by the Best Linear Unbiased Predictor (BLUP), generated by the mixed effect models that included fixed and random intercept and slope over the observational times Logistic regression models to analyse the relationship between the slope of each subscale to PTB - selected significant variables (active duty status, prior birth) were adjusted for | After adjustingfor active duty status and parity, a rise of 1/10 unit of the slope in three prenatal anxiety dimensions (acceptance of pregnancy, preparation for labour, and fear of pain helplessness and loss of control in labour) resulted in an increased odds ratio for PTB by 37% (aOR=1.37, p=0.01, CI 1.09-1.73), 60% (aOR=1.60, p=0.002, CI= 1.18-2.16), and 54% (aOR=1.54, p=0.015, CI=1.09-2.18), respectively | Yes | Half of the sample were receiving an intervention for anxiety at the time of recruitment, military population may not be generalisable to all,  |
| Impact of maternal antepartum depressive and anxiety symptoms on birth outcomes and mode of delivery: a prospective cohort study in east and west coasts of Malaysia | Nasreen et al | 2019 | Investigate the independent effect of maternal antepartum depressive symptoms and antepartum anxiety symptoms on low birth weight, preterm birth, and caesarean section or instrumental delivery among women in the east and west coasts of Malaysia  | Not clear | 10 health clinics in Pahang and Selangor states in the east and west coasts of penninsular Malaysia | East Coast:Mean(SD) age=29.8(5.1), 51.1% secondary educated, 50.9% employed, 48.0% middle incomeWest Coast:Mean(SD) age=29.6(4.1), 67.3% tertiary educated, 64.3% employed, 54.4% middle income | Estimation of gestational weeks at enrolment was based on ultrasound scanning during check-upPTB defined as before 37 weeks gestationMean(SD) gestational age at delivery=39.1(1.5) | N=799 women recruited in their third trimester (>28 weeks) of pregnancy | Malay version of the Depression Anxiety and Stress Scale 21 - only used the 7 anxiety questionsCut off of >8 used to estimate the prevalence of antepartum anxiety symptoms | Prospective cohort study | Baseline data (incl. demographics) were collected during the third trimester at routine antenatal visits via self-reportObstetrics data was collected from the clinics after birth | Excluded if:Non-Malaysian, illiterate, moved out of the study area, multiple birth, intrauterine death | Univariate Cox's regression analyses were carried out to identify possible risk factors of preterm birth - to control the confounding effects of these possible risk factors, adjusted risk ratios were computed using multiple Cox's regression analyses Separate Cox's regression analyses were conducted to show the role of antepartum anxiety symptoms as a risk factor for preterm birth | Univariate regression analyses show antepartum anxiety symptoms were associated with PTB (RR=1.77, 95%CIs=1.01-3.11)In the final model, symptoms of anxiety were not significantly associated with PTB; however antenatal anxiety symptoms were found to be an independent risk factor for PTB in the east coast only (aRR 2.49, 95% CI 1.16-5.36) | Yes - but only on the east coast and only as an independent risk factor (less urbanised, poorer area) | Self-report diagnosis, 49 women gave birth preterm |
| Patterns of change in anxiety and depression during pregnancy predict preterm birth | Doktorchik et al | 2018 | To determine whether changes in anxiety and depression during pregnancy influence the risk of having a PTB, and whether chronic stress modifies this relationship | Not clear | Calgary, Alberta,Canada | 77.4% <35 years age, 79.1% white, 70.2% high income above/incl. $80,000, 89.5% some or completed post-secondary education | 6.4% (n=183) of the total sample was born prematurely | N=2858 women recruited receiving prenatal care in Calgary from August 2008-July 2011, recruited from primary care health offices, community advertising, and the Calgary Laboratory Services  | Spielberger State Anxiety Scale | Prospective cohort studySecondary data analysis of the All Our Babies (AOB) study | Self-report questionnaires administered at 17-24 weeks gestation and 34-36 weeks gestation | Pregnancies with multiple gestation were excluded | Potential confounders included parity, an increased volume of amniotic fluid, smoking, or pregnancy complications (at least one of: vaginal bleedng, placenta previa, placental abruption, preeclampsia, or gestational diabetes) - bivariate analyses were conducted on potential confounders to ensure that they were associated with both the exposures (anxiety or depression) and the outcome (PTB) (if they were not, they were excluded)Logistic regression was used to analyse the relationships between changes in anxiety, depression, and PTB using hierarchically well-formulated models - separate model used for anxiety too | Women who showed an increase in anxiety scores between the 2nd and 3rd trimesters had significantly greater odds of delivering preterm compared to those who had a decline after adjusting for parity, an increased volume of amniotic fluid, smoking, pregnancy complications, chronic stress, social support, maternal age at delivery, ethnicity, history of PTB, income (aOR=2.35, 95%CIs=1.01-5.45, p=0.048) Consistently anxious women were not at significantly greater odds of delivering preterm compared to baseline (aOR=2.09, 95%CI 0.91-4.82, p=0.084). When anxiety was treated as continuous, for every decrease of one point on the anxiety scale, women had 4% lower odds of delivering preterm infants (aOR=0.96, 95%CI 0.94-0.98, p=0.001), after adjusting for parity, an increased volume of amniotic fluid, smoking, pregnancy complications, chronic stress, social support, maternal age at delivery, ethnicity, history of PTB, income | Yes - but only for women who have increased levels of anxiety during pregnancy, not consistent levels | Wide confidence intervals, small number of women gave birth preterm |
| Social stress predicts preterm birth in twin pregnancies | Owen et al | 2017 | To investigate whether stress, anxiety and depression predict preterm birth in twin pregnancies | Not given | Liverpool Women's Hospital, Liverpool, UK | Mean(SD) Age=31.1(5.1), Median/RangeBMI= 24 (19-36)(preterm) and 23 (18-31) (term), 2 of the total sample had a previous preterm labour, 35.6% low SES, 5.2% non-Caucasian | Spontaneous preterm birth classified as <37 weeks | N=115 women at their 20-week antenatal clinic via convenience sampling | Hospital Anxiety and Depression Scale | Prospective cohort study | Participants completed the HADS at 24-28 weeks gestationSocio-demographic details and health behaviours collected at recruitment  | Excluded if:uncertain gestational dates, history of cervical incompetence requiring cervival cerclage, medical complications (e.g., pre-eclampsia), clinical diagnosis of depression | Logistic regression between HADS and DV (preterm/term)Univariable analysis (chi-square) were repeated for three preterm groups (<34 weeks), (34-36 weeks), term, (>37 weeks) - odds ratios also reported after adjusting for age, anxiety and depression scores  | There was no significant differences in HADs anxiety scores between the term and preterm group *t*=2.5, df=113, p=0.082.HADS anxiety scorewas not a significant predictor of preterm birth (OR=1.05, 95%CI= 0.91-1.20, p=.54).No significant differences between the gestational groups for HADs anxiety scores | No | Small sample size, high SES, consideration/control for potential confounders is not clear |
| Effects of prenatal maternal mental distress on birth outcomes | Liou et al | 2016 | To investigate the effects of maternal stress, anxiety, and depressive symptoms across pregnancy on preterm birth and low birth weight | At what time during pregnancy can prenatal maternal mental distress predict adverse birth outcomes? | Teaching Hospital, Southern Taiwan, China | Mean(SD) age= 29.71(4.42), 56.3% primipara, 99% married or cohabiting, 68% college educated or higher, 59.9% employed | Defined as less than 37 weeksMean(SD) gestational age=38.20, 1.379.6% (n=19) babies were born prematurely | T1: N=197, T2: N=196, T3: N=194Participants recruited over 24 gestational weeks (M=29.71, SD=4.42) recruited via professional referrals and personal contacts | Zung Self-reported Anxiety Scale (SAS) - deleted two items using data gathered from the first time period due to low correlation coefficients and so an 18 item version was used in the subsequent tests | Prospective longitudinal study | Self-report questionnairesParticipants were followed up monthly and completed questionnaires at T1 (25-29 gestational weeks), T2 (30-34 gestational weeks) and T3 (>34 gestational weeks) | None given | Hierarchical logistic regression was used to predict preterm birth (dichotomous) - demographic variables entered into step one, T1 variables (stress, anxiety, depression) in step two, T2 variables in step three, T3 variables in step four | T1 anxiety significantly predicted preterm birth (B=-0.28, Wald=6.31, p=0.01, Exp(*B*)= 0.76, but not T2 (B=0.22, Wald=2.95, p=0.09, Exp(*B*)= 1.25) or T3 (B=0.01, Wald=0.01, P=0.94, Exp(*B*)=1.01) | Yes - but only at 25-29 weeks gestation | High SES, non-probability sampling, low proportion of the sample gave birth preterm |
| Maternal prenatal positive affect, depressive and anxiety symptoms and birth outcomes: The PREDO Study | Pesonen et al | 2016 | Investigate whether maternal prenatal emotions are associated with gestational length and birth weight | Not clear | Ten hospital maternity clinics participating in the Prediction and Prevention of Preeclamsia (PREDO) study, FinlandTwo subsamples (high-risk & community-based) were combined | Mean (SD)age= 31.8(4.7), 59.3% multiparaous, 60% tertiary education | Mean(SD)gestational length in weeks=39.39(1.6) -3.9% born prematurelyGestational age was categorical and continuous (preterm birth: <36 6/7 weeks; term birth: 37 o/7-41 6/7 weeks; post-term: >42 0/7 weeks | N=3376 in hospital at the first antenatal scan (for community subsample) at 12 0.7 - 13 6/7 gestational weeks | State Trait Anxiety Inventory | Cohort study | Participant self-report at two-week intervals from 12 0/7 weeks- 13 6/7 weeks until delivery or 38 0/7 weeks- 39 6/7 gestational weeksBirth outcomes obtained from hospital birth records or medical databases | None given | Linear regressions were used to investigate associations with PTB as a continous variables - all analyses were adjusted for maternal age at delivery, parity, delivery mode, education, and infant's sex (Model 1) and further for alcohol consumption and smoking during pregnancy, pre-pregnancy BMI, hypertensive disorders, diabetes, psychotropic medication, social support (Model 2)Logistic regression used to examine whether state anxiety increased the risk of preterm vs. term birth (categorical) | When adjusting for all potential confounders, anxiety in the third trimester only was significantly associated with gestational weeks (B=-0.05, 95%CIs=-0.08;-0.01, p<0.05)When considering PTB as categorical, there was no significant association with anxiety (OR=1.2, 95%CIs=1.0-1.4, p=0.26 in model 2)When gestational length was split into preterm, term, and post-term, mothers with a preterm delivery showen an increase in STAI towards the end of pregnancy (p=0.037) | Yes - but only in the third trimester | High SES, mothers may be aware of potential risks like preterm birth which might cause anxiety, not clear if women were already receiving psychological support, high-risk vs. community based samples may not be similar enough to combine |
| Mental health in early pregnancy is associated with pregnancy outcome in women with pregestational diabetes | Callesen et al | 2015 | To explore the role of early pregnancy health-related quality of life, anxiety, depression, and locus of control for pregnancy outcome in women with pregestational diabetes | Not clear | Center for Pregnant Women with Diabetes, Denmark | Preterm:Median(range) age=31(19-41), Median(range) pregestational BMI=24.0(19.3-39.4), 46% nulliparous, 43% 11-14 years educationTerm:Median(range) age=32 (21-43), Medain(range)pregestational BMI= 25.1(18.4-52.7), 53% nulliparous, 60% >15yrs education) | Median(range) gestational age in days: Preterm=55 (43-92) daysMedian(range) gestational age in days: Term= 60 (38-95) daysPreterm classified as <37 weeks gestationThere were a total of 28 preterm deliveries | N=148 women already participating in a randomized control trialn=118 had Type I diabetes, n=30 had Type II diabetes | Hospital Anxiety and Depression ScaleScores of 8 indicate a borderline score of anxiety, 10 indicate a definite case - a threshold of >8 used in this study | Observational cohort study | Self-report at first antenatal visit (8 gestational weeks) | Excluded if:Severe mental health or psychiatric barriers, or incomplete questionnaires | Unpaired t-testMann-Whitneywas also used because questionnaire responses were skewed - however only parametric reported as results "were similar" | There was no significant difference in HADS Anxiety scale score between preterm and term mothers (Effect size= 0.23, p=0.28), or HADS anxiety scores >8 (p=0.16) | No | Did not control for confounders, small amount of participants who gave birth preterm (28), high risk sample (pregestational diabetes) may not be generalisable |
| Risk of spontaneous preterm birth in relation to maternal depressive, anxiety, and stress symptoms | Sanchez et al | 2013 | To examine the risk of preterm birth in relation to maternal psychiatric symptoms during pregnancy in Peruvian women | Not clear | Hospital Nacional Dos fe Mayo, the Instituto Nacional Materno Perinatal de lima, Hospital Edgardo Rebagliati Martins, Lima, Peru | Control (term):Mean(SD) age at delivery=28.3±6.5, 69.8% (n=335) primiparous, 40.6% (n=195)high school education or lowerCase (preterm):Mean(SD) age at delivery=28.2±6.6, 66.6% (n=319) primiparous, 37.0% (177) high school education or lower | Gestational agewas based on the date of the last menstrual period and was confirmed by an ultrasound exam before 20 weeksPreterm delivery was classified using the American College of Obstetricians and Gynecologists guidelinesPreterm delivery was classified as: spontaneous preterm delivery (22-36 weeks gestation), preterm premature rupture of the membranesFurther classified as: very preterm (delivery prior to the completion of 34 weeks), moderate preterm (delivery between 34 and 36 weeks) | N=479 cases, N=480 controls who had either spontaneously delivered before 37 completed weeks of pregnancy (22-36 weeks of gestation) or women who had delivered at term | Depression Anxiety and Stress Scale 21 | Case control study of women who have given birth spontaneously before 37 weeks gestation and women who have given birth term | In-person interview in which trained research personnel used a standardised, structured Spanish-language questionnaire to elicit information on demographic, lifestyle, medical, and reproductive historyLabour and prenatal medical history extracted from medical records | Women who delivered prior to 37 weeks as a result of medical intervention were not eligible | Confounding variables were assessed by entering potential confounders into a logistic model one at a time, and then comparing the adjusted and unadjusted odds ratios - final logistic models included covariates that altered unadjusted ORs by at least 10%Logistic regression were performed to calculate maximum likelihood estimations. Stratified analysis were also used to assess risks of sub-types of preterm delivery | Compared with the reference group (anxiety symptom score ≤7) women with mild (DASS score 8–9) anxiety symptoms had a modest increased odds of PTB (aOR=1.72; 95% CI 1.11–2.67) after adjusting for maternal age, pre-pregnancy weight, unplanned pregnancy, prenatal vitamin and alcohol consumption during pregnancyWomen with moderate-severe anxiety symptoms (DASS score ≥10), as compared with the reference group, had a greater than 2-fold odds of PTB (aOR=2.76; 95% CI 1.83–4.16) adjusting for maternal age, pre-pregnancy weight, unplanned pregnancy, prenatal vitamin and alcohol consumption during pregnancy | Yes | Anxiety during pregnancy assessed retrospectively, adjusted for a range of confounders  |
| Depression and anxiety in women during pregnancy and neonatal outcome: data from the EDEN mother-child cohort | Ibanez et al | 2012 | To analyse the relation between depression and anxiety in pregnant women and neonatal outcomes including gestational age and birthweight  | Not clear | Two University maternity units, France | Non depressed, non anxious:70.3% aged 25-35, 35.5% >3 years university, 52.3% >1 childrenAnxious, non depressed:68.2% aged 25-35, 35.8% no degree, 53.3% >1 childrenDepressed, non anxious:65.0% aged 25-35, 27.7% >3 years university, 60.9% >1 childrenDepressed and anxious:63.4% aged 25-35, 36.6% no degree, 61.1% >1 childrenDepression status unknown:66.2% aged 25-35, 43.9% no degree, 64.2% >1 childrenAnxiety status unknown:67.1% aged 25-35, 43.8% no degree, 66.1% >1 children | Gestational ageat delivery was estimated from the date of the last menstrual period and early ultrasound assessment - gestational age was assessed in completed weeks of amenorrheaPreterm birth was defined as less than 37 weeks Spontaneous preterm birth was defined as either spontaneous preterm labor or preterm premature rupture of the membranes. Medically indicated preterm delivery was defined as delivery that begins by induction or cesarean section in the absence of spontaneous labor or rupture of membrane as an initiating eventMean(SD) gestational age=39.2(1.7)  |  N=1719 women at <20 weeks gestation  | State Trait Anxiety Inventory (French version)Threshold of >37 was used to distinguish anxious vs. non-anxious | Observational cohort study | Analysis carried out on the 'EDEN mother-child' cohort - Self-report on questionnaires but sociodemographic and biomedical characteristics were obtained in an interview and clinical examination by a midwife in pregnancyBirth outcomes extracted via medical records | Excluded if:Multiple pregnancy, history of diabetes, could not read French, planning to deliver in a different maternity ward or leave the study region within the next three years, stillbirth, foetal malformation | Multivariate models were used to control potential confounders (mother's age and educational level, parity, BMI pre-pregnancy, smoking during pregnancy, hypertension, infant sex, and center - selected a priori)Multiple linear regression models were used to test the association between mental health, gestational age in weeks, and birthweight - as well as logistic regressions for preterm birthWomen split into four cohorts - non-depressed non-anxious, anxious non-depressed, depressed non-anxious, depressed and anxious | In the adjusted analyses, compared with non-anxious women (depressed or not depressed), there was a significant difference in mean gestational age (p=0.06), and spontaneous preterm birth (OR=1.78, 96%IC=0.97-3.21, p=0.06) in all anxious women, but not between medically indicated preterm birth (OR=1.78, 96%IC=0.97-3.21, p=0.74) or preterm birth (OR=1.40, 96%IC=0.85-2.30, p=0.19)  | Only for gestational age and spontaneous preterm birth, but not medically indicated or preterm birth | Only considered trait anxiety, mental health questionnaires self-administered |
| Anxiety and optimism associated with gestational age at birth and fetal growth | Catov et al | 2010 | Investigate the separate and joint effects of prospectively assessed trait anxiety and dispositional optimism on gestational age and infant birth centile | Not clear | Magee-Womens Hospital in, Pittsburgh PA, USAAnalysed a subset of data from a wider prospective study that recruited women from a range of private practices - the current study only included women who delivered at the above setting | Mostly between the ages of 18 and 25, more than a high school eduction, unmarried, more than half had public assistance, 30% African American | Gestational age assessed upon delivery based on early pregnancy ultrasoundsPreterm birth classified as <37 weeks of gestationn=65 (9.6%) of births were preterm | N=667 recruited at a mean(sd) gestational age of 17.6(3.9) weeks | State Trait Anxiety Inventory | Prospective cohort study | Women took part in an initial enrollment interview at <21 weeks and were asked to complete the STAI via self-report | None given | Pearson correlations between anxiety and gestational age Separate multivariable linear regression models assessed the association between anxiety and gestational ageLogistic models also assessed the association between the psychosocial measures and preterm birthAnxiety was treated as continuous and as the highest quartile of anxiety (Speilberger >20 vs <20)Analyses adjusted for age, race, pre-eclampsia, and smoking | After adjusting for potential covariates, each standard deviation increase in anxiety was associated with a gestational age that was 1.6 days shorter (B=-1.2, SE=0.65, p=0.06).Participants with anxiety scores >12 had 3.3 days shorter gestations (p=0.03)For each standard deviation increase in anxiety, gestational age decreased by 3.7 days in African American women (B=-3.7, SE=1.30, p<0.01); for those with scores >12, gestation was 8.2 days shorter (p<.01) | Yes - this association may be greater in African American women | Modest sample size, only one antenatal assessment |
| Pattern of percieved stress and anxiety in pregnancy predicts preterm birth | Glynn et al | 2008 | To determine whether the pattern of prenatal stress, as compared to prenatal stress assessed at a single gestational time point, predicts preterm delivery | Not clear | Pregnant womenreceiving prenatal care from Cedars-Sini Hospital, Los Angeles or the faculty obstetric practice at the University of California Irvine Medical Center, USA | 48% non-Hispanic white,38% some college education, average household income $63,181, average age at delivery- 30.6, 57% nulliparous | Length of gestationwas determined by the last menstrual period and confirmed by early pregnancy ultrasound (if there was a discrepency, then the estimate was revised based on the ultrasound)Preterm birth was classified as <37 weeks gestation (and also as a dichotomous variable (0=term, 1=preterm)n=38 women gave birth preterm | N=415 women at <18 weeks gestation | State Trait Anxiety Inventory and Pregnancy Related Anxiety Scale | Longitudinal study | Structured interviews and questionnaires at two prenatal visits (18-20 weeks (Mean=19.3, SD=0.8); 30-32 weeks (Mean=31.0, SD=0.8) | Not eligible if:non-English speaking, gestational age >18 weeks, multiple gestation, smoking | First conducted an examination between preterm birth and prenatal stress at both timepoints using conventional methodsThree potential sources of stress - pregnancy anxiety, medical risk for preterm birth, and life events - were analysed in conjunction with change in stress using hierarchical logistic regression models to predict preterm birthConfounders associated with the dichotomous change variables were race and parity | A two-way repeated measures ANOVA revealed a statistically significant interaction between group and time for state anxiety F(1, 413)=3.87, p=.05.Women who delivered preterm were significantly more likely to show increases in state anxiety between the timepoints X2 (1, 415)>6.3, p<.05After adjusting for race and parity, those who showed an increase in state anxiety were more than twice as likely to have delivered preterm (OR=2.49, 95%CIs=1.24-4.98)Pregnancy anxiety was not a significant predictor of preterm birth in any of the analysesWhen assessing if dichotomous change in state anxiety was a unique predictor of preterm birth, after the addition of all potential confounders, change in state anxiety became non-significant (OR=1.80, 95%CIs=0.83-3.97) | Yes - but not with pregnancy anxiety | Did not measure in the first trimester, mostly non-Hispanic white women, small number of the overall sample gave birth preterm |
| Neonatal outcome following maternal antenatal depression and anxiety: a population-based study | Andersson et al | 2004 | Determine neonatal outcomes among women who had depressive and anxiety disorders during their second trimester of pregnancy | Not clear | Umeå UniversityHospital and Sunderby Central Hospital, Sweden | Preterm delivery was defined as less than 37 weeks of gestation - this was estimated accoring to the result of the second-trimester ultrasoundSpontaneous preterm birth was defined as rupture of membranes and/or premature labour before 37 completed weeks of gestationApproximately 5% of the each group gave birth preterm | Preterm delivery was defined as less than 37 weeks of gestation - this was estimated accoring to the result of the second-trimester ultrasoundSpontaneous preterm birth was defined as rupture of membranes and/or premature labour before 37 completed weeks of gestationAntenatal anxiety disorder (exposed) n=3 (4.7%) gave birth pretermNo antenatal anxiety disorder (unexposed) n=65 (5.2%) gave birth preterm | N=1465 recruited at their second-trimester ultrasound n=64 antenatal anxiety disorder (exposed)n=1261 antenatal anxiety disorder (unexposed) | Primary Care Evaluation of Mental Disorders classification system | Population based (cohort) study | Women completed the PRIME-MD patient questionnaire before attending an ultrasound examination - if this indicated a mental disorder they were considered "positive" and they took part in a telephone interviewMedical records obtained three months after delivery | Excluded if:Refusal to participate, language difficulties, excess numbers of patients, other factors, detection of a malformation or missed spontaneous abortion or malformation, could not be reached within 14 days, stillbirth, twins | Bivariate logisitc regression analysis was used to compute odds ratios for neonatal outcome in terms of birth weight, small-for-gestational-age birth, overall preterm birth, and spontaneous preterm birthAdjusted odds ratios for all variables were computed using a multiple logistic regression that included possible maternal confounding variables according to prior studies (maternal age, parity, marital status, socioeonomic status, smoking status, oral use of finely ground tobacco, first trimester BMI, history of chronic diseases) | After adjusting for age, marital status, socioeconomic status, smoking habits, and BMI there was no significant difference between neonatal outcome and overall premature birth (OR=1.02, 95%CIs=0.30-3.45) or spontaneous preterm birth (OR=0.61, 95%CIs=0.08-4.61) (yes/no) | No | Psychiatric diagnosis only made at one point during pregnancy, representative number gave birth preterm overall |
| Role of anxiety and depression in the onset of spontaneous preterm labor | Dayan et al | 2002 | To investigate the effects of antenatal anxiety and depression on spontaneous preterm labor | Not clear | Department of Obstetrics and Gynecology at the University Hospital of Caen, France | 81.4% 20-34yrs, 88.8% married or cohabiting, 94.3% European, 66.2% secondary school education, 41.3% lower level of employment, 52.5% 1-2 parity | Gestational age verified at enrollment that each woman had an ultrasonographic examination by 20 weeks of gestationDiagnosis of preterm labour classified as:gestational age between 20-37 completed weeks of gestation, at least one contraction every 10 minutes for at least an hour, and at least one cervical change such as dilation or effacement as assessed by Bishop's scoreSpontaneous preterm labour occured in 11.4% (n=72) | N=634 women were recruited between 20-28 weeks gestation | State Trait Anxiety Inventory (French version)75th percentiles of the two distributions were used as thresholds to indicate high levels of anxiety scores | Cohort study | Self-report questionnaires for anxietyMedical data and sociodemographic characteristics were extracted from obstetric records | Excluded if:multiple pregnancy, placenta previa, cerclage, preterm prelabor rupture of the membranes, delivery at another hospital | The association between preterm labor and each of the explanatory variables was assessed using univariate logistic regression models (continuous variables into categorical) A backward multiple logistic regression analysis was then applied to isolate the effect of each factor adjusted for all of the others. The initial model incorporated the main predictor variables (psychological factors) and the potential confounding covariates related to the outcome variable at the p< 0.25 level in the univariate analysis | The association between spontaneous preterm labour and state anxiety scoring above 45 (OR= 1.7, 95%CIs 0.97-2.8) and trait anxiety scoring above 45 (OR= 1.7, 95%CIs 1.0-2.8) were not significantNeither state or trate anxiety were significant in the model resulting from the backward multiple logistic regression analyses | No | Mostly Europeanethnicity, small number of the sample gave birth preterm, controlled for a wide range of medical and obstretric confounders including prior PTB |
| The effect of anxiety and depression during pregnancy on obstetric complications | Perkin et al | 1993 | To investigate the effects of anxiety and depression during pregnancy on obstetric complications | Not clear | District general hospital in Inner London, United Kingdom | 64.8% 0-level, trade or no qualifications, 80.5% married, 55.4% employed, 35.5% aged between 25-29 | Preterm delivery defined as gestational age of 36 weeks or less (<36 weeks classed as premature, >37 weeks classed as term) | N=1515 women recruited via consecutive sampling whilst booking for delivery | General Health Questionnaire | Prospective population study | Women were interviewed at four points during pregnancy: at booking, 17 weeks, 28 weeks, and 36 weeks - anxiety was measured at all but 17 weeksObstetric data extracted from obstetric records | Participants were ineligible or excluded from the study if:refusual to participate, spontaneous abortion, change of address, missing data on biological variables, missed interviews, macerated stillbirth, infants with major congenital malformation | Relationship between preterm birth and the possible confounding factors were analysed using X2 A logistic regression model was used with each obstetric variable as a dichotomous outcome, alongside anxiety scores as well as all other factors that were significantly related to that outcomeThe maximum anxiety scores were divided into quartiles and coded into the model from 0-4 | Anxiety was not significantly associated with preterm delivery (OR= 0.99, 95%CIs= 0.73-1.34, p=0.94, R2%= 0.00) - depression, lie scale scores, qualifications, missed antenatal visits, alcohol use at 28 weeks, and blood pressure at 32 weeks was also added to the model) | No | Inclusion criteria limited to caucasian women |
| Psychosocial influences on newborn outcomes: a controlled prospective study | Pagel et al | 1990 | Hypothesised that after controlling for the influences of demographic, biomedical, and lifestyle risk factors:Increasing social supports/family function would be associated with better infant outcomes, increasing life events stress and anxiety would each be associated with poorer outcomes, social supports would buffer the impact of either life evens or anxiety on the outcomes | Not clear | Prenatal clinics of six Seattle, Washington area hospitals, USA | Mean(SD) age=26.3(5.3), Mean(SD) education year= 14.1(2.2), 78% white, 84% married, 75% nulliparous | When more than one technique was used to estimate gestational age (e.g., last menstrual period, Dubowitz, ultrasound) a median of the estimates was usedMean(SD) gestational age=39.8(2.1) | N=100 recruited between 21 and 36 weeks of pregnancy (median 32 weeks) | State Anxiety Scale  | Prospective study | Participants filled out a questionnaire with information about demographics, general health, pregnancy and psychosocial information during their visit at the clinic - a trained interviewer reviewed these questions with the participantBirth outcomes extracted from medical charts  | Not clear | Hierarchical regressionDemographic factors and obstetric characteristics were accounted for as confounders (income, age, educational level, marital status, race, parity, height, weight, weight gain, caesearan section, bio risk, pregnancy risk, drinks per week, smoking, life changes, APGAR score) | After controlling for confounders, anxiety was not significantly associated with gestational age R2= 0.24, ΔR2<0.01, p=0.78 | No | Small sample size, proportion of women who gave birth preterm not clear, controlled for a wide range of demographic, lifestyle and medical risk factors |
| The preterm prediction study: Maternal stress is associated with spontaneous preterm birth at less than thirty-five weeks' gestation | Copper et al | 1996 | Determine whether various psychosocial factors (stress, anxiety, depression, self-esteem, mastery) are associated with spontaneous preterm birth, fetal growth restriction, or low birth weight | Not clear | 10 participating centresCountry not explictly stated | Black (63%), Multiparous (59%), income <$800 per month (54%), <13 years of education (72%), single (72%), age <24yrs (66%) | Gestational age was based on an ultrasonographic examination at 15-24 weeks - based on the last menstrual period if the two agreed within 10 days of each other (if not, just the ultrasound was taken into account)Spontaneous preterm birth was defined as preterm labour or premature rupture of membranes at <35 weeks gestation 3.9% had a spontaneous preterm birth, and 15.5% had a preterm birth | N=2593 participants recruited at or before 24 weeks' gestation  | Abbreviated Scale for the Assessment of Psychosocial Status in Pregnancy - it is an adaptation of five previously validated tools that measure trait anxiety, self-esteem, mastery, depression, and stress | Prospective study | Participants were examined between 22-24 weeks gestation, and subsequent visits took place 2, 4, and 6 weeks after the first visitPsychosocial assessment was given at mean(SD) gestational age= 26.1(0.8)weeks | Sonogram was conducted to rule out fetal malformations - participants were inelgible to participate if they had multiple gestation, cerclage, placenta previa, or major foetal anomly | X2 analysis was used to compare characteristicsPsychosocial score as a continuous variable and each principal factor score and maternal demographic characteristics were included in a logistic regression model to determine which characteristics were significantly associated with preterm birth | There was no significant difference between participants who had anxiety scores in the <25th percentile and >25th percentile and spontaneous preterm birth (p=0.37) After adjusting for maternal age, marital status, government insurance, education, tobacco, alcohol or drug use, and race anxiety was not significantly associated with spontaneous preterm birth OR= 1.02, CI 0.99-1.06, p= 0.25 | No | Underrepresentedsample, black race (p=0.05), alcohol use (p=0.05), education per year (p=0.03) were demographic factors also associated with spontaneous preterm birth |
| Effects of depression, anxiety, self-esteem, and health behaviour on neonatal outcomes in a population-based Hungarian sample | Bödecs et al | 2011 | To investigate possible associations of maternal antenatal depression, anxiety, and self-esteem with negative neonatal outcomes, after controlling for the effects of demographic covariates and health behaviour | Not clear | 18 districts inWestern Hungary | 59.4% married, 37.8% Higher/University level education, 53.3% lower-middle socio-economic status,  | Gestational age was measured immediately after birthMean(SD)gestational age for boys=38.8(1.89)Mean(SD)gestational age for girls=38.6(2.02) | N=261 participants - prenatal data collection was carried out at registration | Spielberger State-Trait Anxiety Inventory form Y (Hungarian version)Only used the trait anxiety block  | Prospective cohort study | Prenatal data collection carried out during registration for prenatal care at a clinic Outcome variables measured and assessed after birth | Excluded if: could not interpret the questionnaire (due to lack of Hungarian language or extremely restricted mothers moved from the area, multiple pregnancies, stillbirth, spontaneous abortion | Relationship between explanatory and outcome variables was tested in girls and boys separately by multiple linear regressionFor covariances, explanatory variables were entered into the model by forward method and categorical variables used as dummy variables - gender differences assessed by t-test | Anxiety did not predict gestational age in either boys or girls. | No | Only assessed anxiety at one timepoint, no psychiatric diagnosis of anxiety, not clear which confounders were added to the model |
| Neonatal outcomes in offspring of women with anxiety and depression during pregnancy | Berle et al | 2005 | To examine the effect of anxiety disorder and depression in pregnancy women on neonatal outcomes andcompare neonatal outcomes between offspring of attendees/non-attendees  | Not clear | 24 municipalities of Nord-Trøndelag County of Norway, Norway | 15% single, 85% living with partner, 58.8% high school educated | Preterm birth defined as <259 days gestationMean(SD) days gestational length= 281(14.8)3.7% of births were premature (n=22 - in 83 pregnancies, gestational length was not calculated | N=680 pregnant women were identified from the Nord-Trøndelag County (HUNT-2) by linkage with the Medical Birth Registry of Norway - eligible participants were sent a letter inviting them to participateAnxiety disorder was only assessed in 71/680 | Hospital Anxiety and Depression Scale (HADS-A)Cut-off scores of 8 and above were applied as defined anxiety disorder | Prospective cohort study | Participants completed demographic, health, and psychological questions in person before their first examinationObstetric and neonatal outcomes extracted from a national birth registry | None mentioned | Potential confounders were examined with logistic regressions and Pearson's correlationDemographic, biological,and obstetric variables were examined with logistic regression analyses to assess for potentially confounding variables - this was done for each of the variables, then for blocks of demographic, somatic, and obstetric variables, and finally for one block of all these variablesAssociations between risk factors and anxiety and depression, and between risk factors and neonatal outcome were analysed using a Pearson's correlation - Stage of pregnancy was included as covariate in the regression analyses and calculated both as a continuous variable and categorized intofirst, second and third trimesterGestational age was divided into three categories <37, 37-38, >39 weeks | In women who indicated a gestational length of <259 days, gestational length was not significantly associated with anxiety disorder OR= 1.24, 95%CI= 0.62-2.80, p= 0.478 | No | Low rate of preterm birth in the sample overall, low power for the analysis of the relationship between anxiety disorder and gestational age (0.25), HADS assessed by a single measure at any point during pregnancy, did not control for any pre-existing diagnosis of anxiety |