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Unplanned Pregnancy in Anorexia Nervosa

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Abstract

Objective—To compare the frequency with which unplanned pregnancies occur in individuals with anorexia nervosa (AN) relative to women without eating disorders in the large Norwegian Mother and Child Cohort Study.

Method—In a sample of 62,060 women, 62 reported AN. Using data from a questionnaire completed by all participating mothers, we compared mother's age at birth and the frequency with which mothers reported their index pregnancy as being unplanned.

Results—AN women were younger (26.2 years; SD=4.76) than women with no eating disorder (29.9 years; SD=4.60) at the time of birth. Significantly more women with AN (50.0%) reported unplanned pregnancy than women in the referent group (18.9%). After adjustment for maternal age and infertility treatment, the relative risk (RR) of unplanned pregnancy in individuals with AN was 2.11 (95% confidence interval [CI]=1.64–2.72). Induced abortion was also significantly more common in women with AN than referent women (24.2% versus 14.6%).

Conclusion—The higher rate of unplanned pregnancy and abortion in women with AN is of clinical concern as absent or irregular menstruation may be misinterpreted as decreasing risk of pregnancy.

Introduction

Early studies of women with anorexia nervosa (AN) suggested that pregnancy was rare secondary to endocrinological disturbances associated with starvation coupled with the psychological and psychosocial features of the disorder (1, 2). An estimated 68–89% of women with AN presentations report amenorrhea (Criterion D; i.e. absence of menstruation for at least 3 months) during their illness (3–6). and an additional 6–8 % report oligomenorrhea (6). The high prevalence of menstrual disturbance has contributed to the (mis) conception that women with AN are unlikely to conceive.

Although results are mixed (7), several outcome studies of women with AN suggest that there are no differences in fertility rates in women with a history of AN and women in the general population (8, 9). In addition, rates of fertility treatment in women with AN may not differ from the general population (8). Thus, despite high rates of menstrual dysfunction, women with AN are becoming pregnant.

Conception can occur in the absence of menstruation. When ovulation occurs for the first time following a period of amenorrhea and anovulation, the first egg can become fertilized. If fertilization occurs, maintenance of the embryo will prevent shed of endometrial tissue and ovulation will not be followed by menstruation. In this rare case of fertilization upon first appearance or reappearance of ovulation, a woman can become pregnant without prior menstruation. This phenomenon has been documented in the literature in premenstrual young women (upon menarche), nursing mothers, older women who believe they have entered menopause, and women with amenorrhea secondary to AN (3).

A consistent observation in population-based studies of women with AN is earlier age of pregnancy relative to women in the general population (10, 11). Although these studies did not necessarily address age at first pregnancy, the consistent pattern was of interest and we hypothesized that this observation could be due to women with AN believing that the absence of menstruation means they are not “at risk” for pregnancy and are experiencing unplanned pregnancies at greater rate than women in the general population.

We estimated the frequency with which women with AN reported unplanned pregnancies relative to a population referent group in the large Norwegian Mother and Child Cohort Study (MoBa).

Materials and Methods

Material and Methods

The data collection was conducted as part of the Norwegian Mother and Child Cohort Study (MoBa) at the Norwegian Institute of Public Health (12). The study has been approved by the Institutional Review Board of the University of North Carolina at Chapel Hill and appropriate regional committees for ethics in medical research and the Norwegian National Data Inspectorate.

MoBa is a prospective pregnancy cohort study. Pregnant women are recruited through a postal invitation after registering for a routine prenatal ultrasound at about 18 weeks' gestation. Participating women sign informed consent, donate blood and urine samples, and receive a questionnaire. The present study is based on this first questionnaire (Questionnaire 1). The MoBa cohort is linked to Norwegian health registries, particularly the Medical Birth Registry of Norway (MBR) (13) to capture pregnancy outcome variables.

Questionnaire 1 included items on eating disorders and behaviors derived from studies of the Norwegian Institute of Public Health Twin Panel (14) that reflected DSM-IV criteria for eating disorders (15). Diagnostic algorithms captured broadly defined AN (DSM IV criteria excluding amenorrhea and endorsing a body mass index (BMI) $< 19.0 \text{ kg/m}^2$ at the time of low weight) AN was assessed in the period 6 months prior to pregnancy only due to the practical difficulties in determining low weight in the presence of pregnancy-related weight gain. Self-reported weight and height were used to calculate BMI measures. Individuals with other eating disorders (i.e., bulimia nervosa, eating disorders not otherwise specified, and binge eating disorder) were not included in the referent group and were excluded from analyses as our hypotheses concerned AN only.

The current study is based on version 4 of the quality-assured data files released in 2009. The analysis population for this report included MoBa participants who: a) had information from both the MoBa Questionnaire 1 and the MBR, b) did not complete an early pilot version of Questionnaire 1 ($n=2,599$), c) had valid values for self-reported age, weight, and height, d) returned Questionnaire 1 before delivery, and e) had a singleton birth. If a woman enrolled in MoBa more than once (due to additional pregnancies), only the first pregnancy that occurred during the course of MoBa data collection was included. Of the initial 91,489 mother-child records, 74,107 (81%) met the five criteria above. Overall, from 1999–2006, ~42% of invited mothers have agreed to participate in MoBa (12, 16). The sample used for this analysis included women with AN ($n=62$) or no ED ($n=62,652$) as described by Bulik et al. (10) Excluding women with missing values for the question regarding planned pregnancy ($n=924$) results in a final sample size of 62,060 (Figure 1). Respondents from the sample completed questionnaire 1 at a median of 18.6 weeks gestation ($n=46,893$) (inter-quartile range 17.1–20.6 weeks and range 4.1–42.3 weeks).

Unplanned pregnancy was determined by participant's answer to one question regarding whether the current pregnancy was planned. Infertility status was based on participants' self-report of receiving fertility treatment. History of induced abortion was based on a single question about past abortions. Amenorrhea was assessed by a single question "During the last year before you became pregnant, did you lose your period for more than three months?" The response options were "No/Yes, due to another pregnancy/Yes, for other reasons."

Statistical Analyses

Descriptive statistics are means and standard errors for continuous variables and percent distribution of categorical variables. Poisson regression was used to characterize the proportion and relative risk of unplanned pregnancy by group (AN versus no-ED) (17–19). Unplanned pregnancy was a dichotomous outcome variable and group was the categorical predictor variable with and without adjustment for potential confounders: maternal age and infertility status. These two confounders were selected due to their potential association with both the subtype covariate and the response variable. In this sample, age and infertility status were inversely associated with unintended pregnancy. We used generalized estimating equations (20, 21) to provide robust error estimates given under-dispersion of the data (19). In post-hoc analysis, we explore whether the risk of unplanned pregnancy was related to the presence of amenorrhea in the year before pregnancy. To estimate the relative risk of unplanned pregnancy for those with amenorrhea versus those without in both the AN and referent group another model similar to the previous Poisson regression was used. In addition to unplanned pregnancy as the response and a predictor representing eating disorder subtype, there were two additional covariates representing a dichotomous amenorrhea status variable and an interaction term between amenorrhea status and eating disorder subtype. A chi-square statistic was used to test differences in proportion of induced abortions by ED subtype. All analyses were performed using SAS/STAT software, Version 9.1 of the SAS System for Windows (22). The funding source had no role in any aspect of these analyses.

Results

Table 1 presents demographic information on the sample. The mean age of index pregnancy of women with AN was 26.2 years ($SD=4.76$) and of women with no eating disorder before or during pregnancy was 29.9 years ($SD=4.60$). Of women with AN, 50.0% reported the pregnancy was unplanned compared with 18.9% of women with no eating disorder. The percentage of women who reported having used contraception in the year before pregnancy was similar across groups (94.9% AN; 94.7% no eating disorder). In terms of infertility treatment, 4.8% of women with AN and 8.3% of women with no eating disorder reported

some form of infertility treatment. After adjustment for maternal age and infertility treatment, the relative risk (RR) of unplanned pregnancy in individuals with anorexia nervosa was 2.11 (95% confidence interval [CI]=1.64–2.72) compared to women without eating disorders prior to pregnancy.

In a post-hoc exploratory analysis, we attempted to estimate whether unplanned pregnancies were more common in women reporting amenorrhea in the year before pregnancy. A total of 14.5% (n=9) of women in the AN group and 5.5% (n=3,389) women in the referent group reported amenorrhea in the year before pregnancy. The relative risk of unplanned pregnancy for those reporting amenorrhea versus no amenorrhea in the AN group was 1.13 (95% CI=0.59–2.16) and in the referent group 1.01 (95% CI=0.94–1.08).

In separate questions dealing with reproductive history, we assessed past induced abortions and found that around one quarter of the women with AN reported having at least one abortion (24.2%, n=15) versus 14.6% (n=9,069) in the sample without eating disorders $\chi^2=4.54$ (df=1), p=0.033.

Discussion

The age of index pregnancy in women with AN in the MoBa cohort was younger than in mothers with no eating disorder. The risk of having an unplanned pregnancy was significantly elevated in women with AN with over half reporting that the index pregnancy was unplanned. Further supporting our observation, women with AN also reported significantly higher rates of past abortion. The unplanned pregnancies did not appear to be due to differential contraception use, although our assessment of contraception use was cursory and consisted of one question covering the year before pregnancy. We have no information on consistency of contraceptive use. Similarly, reported amenorrhea in the year before pregnancy did not increase the relative risk of unplanned pregnancy, although our assessment of amenorrhea was similarly cursory.

It is possible that absent or irregular menstruation and the belief that menstrual irregularities reduce the risk of conception are associated with reduced adherence to contraception guidelines or instructions, increasing the risk of unplanned pregnancy.

We present our data as suggestive and as a starting point for further, more detailed investigations. Our study has limitations. First, our assessment was not sufficiently detailed to explore the question of unplanned pregnancy in depth. More comprehensive assessments of menstrual history, contraceptive use, and pregnancy history are required to obtain a fuller picture of the mechanism of unplanned pregnancy in AN. Second, 42% of women invited agreed to participate in MoBa. Although somewhat low, this response rate is typical for large epidemiologic studies and does not necessarily imply a biased sample (23). MoBa participants may also be somewhat more educated than the general Norwegian population (24). Third, the sample represents women invited to participate around the 17th–18th week of pregnancy (12), and unplanned pregnancy estimates most likely are underestimated in this sample compared to the total cohort of women who conceived around the same time. Finally, given the considerable effort required to participate in the various waves of the MoBa protocol, the women with AN who do choose to participate may represent the healthier end of the eating disorder severity spectrum.

In terms of clinical implications, it is important to ensure that women with AN recognize risk of becoming pregnant despite menstrual irregularities. Stereotypes regarding the absence of sexual activity and infertility in AN should not inhibit clinicians from speaking directly with patients with AN about sexuality, contraception, and pregnancy. Planned pregnancies in women with eating disorders increase the opportunities for appropriate

nutritional and emotional support to assist them with the physical and psychological challenges of pregnancy and motherhood.

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Figure 1.
Participant flow to achieve final analysis sample.

Table 1

Sample Demographics

	Anorexia Nervosa (n=62)	No Eating Disorder (n=61,998)	Total (n=62,060)
Maternal age (yrs) Mean (SD)			
	26.2 (4.76)	29.9 (4.60)	29.9 (4.60)
BMI before pregnancy (kg/m²) Mean (SD)			
	18.1 (0.64)	23.9 (4.19)	23.9 (4.19)
Min. possible income for mother and father N (%)			
0-\$36,000 (200,000NOK)	15 (25.9)	5,122 (8.9)	5,137 (8.9)
>\$36,000 (200,000NOK)	29 (50.0)	29,262 (50.8)	29,291 (50.8)
>\$89,000 (500,000NOK)	7 (12.1)	14,677 (25.5)	14,684 (25.5)
>\$125,000 (700,000NOK)	7 (12.1)	8,490 (14.8)	8,497 (14.7)
Mother's education N (%)			
<3 year high school	10 (17.9)	4,500 (7.7)	4,510 (7.7)
Vocational high school	13 (23.2)	7,718 (13.2)	7,731 (13.2)
3-year high school general studies, junior college	13 (23.2)	8,929 (15.2)	8,942 (15.2)
Regional technical college/4-year university degree	11 (19.6)	24,242 (41.3)	24,253 (41.3)
University, technical college, more than 4 years	9 (16.1)	13,292 (22.7)	13,301 (22.6)
Marital status of mother N (%)			
Married	20 (32.3)	28,804 (46.7)	28,824 (46.6)
Divorced/separated	0 (0.0)	169 (0.3)	169 (0.3)
Cohabitant	38 (61.3)	30,767 (49.8)	30,805 (49.8)
Widow	0 (0.0)	6 (0.0)	6 (0.0)
Single	4 (6.5)	1,309 (2.1)	1,313 (2.1)
Other	0 (0.0)	684 (1.1)	684 (1.1)