Maternal psychopathology and mental health treatment delay in adolescents from a national cohort

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Objective: To investigate whether maternal psychopathology predicts mental health service use and treatment delay in offspring with mental disorders.

Data Sources: Weighted data collected between 2001 and 2004 from NCS-A participants (age: 13-18 years; N = 2939) meeting DSM-IV criteria for any lifetime mental disorder, assessed with WHO CIDI, and from their biological mothers.

Study Design: National representative cohort.

Data Collection: Maternal psychopathology was assessed with self-report, adolescent mental health service use with the Service Assessment for Children and Adolescents.

Principal Findings: Maternal psychopathology predicted offspring mental health service use across various service sectors, except for school services. In the mental health specialty sector, estimates were highest for maternal affective (hazard ratio (HR) = 2.17, 95 percent confidence interval (CI) = 1.66-2.82) and any mental disorder (HR = 2.13, 95 percent CI = 1.53-2.97). For offspring use of any mental health services, estimates were highest for maternal behavior (HR = 1.60, 95 percent CI = 1.15-2.21) and substance use disorders (HR = 1.57, 95 percent CI = 1.09-2.24). Treatment delay of offspring mental health service use was predicted by maternal behavior disorders.

Conclusions: Maternal psychopathology fostered mental health service use in offspring with mental disorders, while maternal behavior disorders might also retard treatment. Considering parental psychopathology may help improving the prevention of unmet offspring service needs.

KEYWORDS

adolescent, epidemiology, maternal psychopathology, mental health service use, treatment delay

1 | INTRODUCTION

Mental disorders pose a great challenge to the public health system. They are highly prevalent, in adults^{1,2} and in children and adolescents,³⁻⁵ and contribute substantially to the global burden of disease.⁶ A large body of evidence on familial transmission of mental disorders suggests that children of parents with mental disorders are at higher

risk of developing a mental disorder themselves, as compared to children with no family history of mental disorders.^{7,8} Parental psychopathology predicts the course of the offspring's disorder, indicating a more severe course of the offspring's disorder with an earlier age of onset, higher symptom severity, and elevated rates of recurrence.⁸

Although child and adolescent mental health recently came into the focus of special attention of major medical journals,⁹ and even

though evidence-based therapy approaches exist,¹⁰ only about 30–50 percent of affected children and adolescents receive treatment for their mental disorders.^{11,12} Furthermore, initial treatment contact after disorder onset is mostly delayed, in many cases for more than a decade.^{13,14} Notably, an early age of onset of mental disorders in childhood or adolescence was consistently found to predict longer delays,^{13,14} which is alarming given the early median ages of onset.¹⁵ Continuity of psychopathology from childhood and adolescence to adulthood has been demonstrated.¹⁶ Treatment delays correlate with adverse outcomes such as the development of comorbid disorders¹⁷ and low treatment response.¹⁸ In order to improve the access to early interventions for child and adolescent mental disorders, predictors of mental health service use and treatment delays need to be identified.

The role of familial psychopathology has been suggested as one important candidate that may predict offspring mental health service utilization.¹⁹ Previous studies found that parental psychopathology was associated with higher unmet service needs in offspring.^{20,21} In contrast, other authors²² reported that mothers with mental health problems tended to perceive their offspring's behavior more problematic than well-adjusted mothers. A lower threshold for perceiving their children's emotional and behavioral problems as in need for treatment might lead to increased service use in offspring of mothers with mental disorders.²³ Furthermore, former mental health service experience of parents or other family members was associated with increased offspring service utilization.²⁴ According to the latter studies, we hypothesized a positive association between parental psychopathology and offspring mental health service use rate. As yet, research on the association between parental psychopathology and offspring mental health treatment delay is lacking. However, in accordance with the above-mentioned findings on the association between parental psychopathology and offspring mental health service use rate, both a positive and a negative association between parental psychopathology and offspring treatment delay might be hypothesized.

Previous studies on the association between family psychiatric history and offspring mental health service use mostly included non-representative samples,^{20,25,26} focused on specific child or parental mental disorders or service sectors,^{19,20,23–26} or did not report the association between parental psychopathology and offspring mental health treatment delay. In our study, we wanted to estimate the association of various maternal mental disorders with i) mental health service use by offspring with mental disorders and with ii) offspring treatment delays across multiple service sectors in adolescents of a nationally representative cross-sectional survey.

2 | METHODS

2.1 | Study sample

Data of this study stem from the National Comorbidity Survey Replication Adolescent Supplement (NCS-A), a nationally representative face-to-face survey of 10 148 United States adolescents (age:

13–18 years). The NCS-A was carried out in a dual-frame design between February 2001 and January 2004; details have been described elsewhere.^{27–29} Further information on the NCS-A can be obtained at <http://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/28581/version/2>. For this study, we considered a subset of 6483 adolescents, restricting the initial NCS-A sample ($n = 10\,148$) to those adolescents who were in school at the time of survey ($n = 10\,123$) and for whom interviews and parent self-administered questionnaires (SAQ) were available ($n = 6483$). As the majority (81.07 percent) of parent questionnaires was completed by biological mothers, we included only biological mother-offspring dyads. Furthermore, we included only adolescents who fulfilled Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for any lifetime mental disorder, resulting in a subsample of 2939 adolescents on which our analyses are based. Diagnostic information was assessed with an adolescent-adjusted version of the World Health Organization Composite International Diagnostic Interview (WHO CIDI) version 3.0. This structured clinical interview showed good concordance in blinded clinical appraisal interviews.³⁰ In the WHO CIDI, various DSM-IV mental disorders were assessed, including anxiety disorders, affective disorders, behavior disorders, substance use disorders, and eating disorders.²⁹ Trained interviewers conducted the computer-assisted interviews with the adolescents, and good quality of the interview was ensured.^{27,28} Additional diagnostic information on adolescent mental disorders (ie, attention-deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, major depressive disorder, and dysthymic disorder) was collected from biological mothers in the SAQ, because previous studies found that collecting information from parents on those disorders to be of additional diagnostic value.²⁹ Information of mothers and adolescents was combined whenever available. We considered any mental disorder as present if diagnostic criteria for at least one mental disorder were met either based on information obtained from adolescent or mother. Age of onset of any mental disorder was defined as the age at which criteria for a mental disorder were met for the first time. If a participant fulfilled criteria for more than one disorder, or, in case of discrepancies between adolescent or maternal report, the earliest age of onset was considered. Mothers and adolescents gave written informed consent, and the Human Subjects Committees of the Harvard Medical School and the University of Michigan approved the NCS-A.²⁷

2.2 | Assessment of maternal mental disorders

Information on maternal psychopathology was obtained from maternal self-report in the SAQ using items based on the Family History Research Diagnostic Criteria Interview and advanced versions,^{31,32} as directly interviewing first-degree relatives of study participants is considered more accurate and precise than interviewing study participants about mental disorders of their first-degree relatives.³¹ Mothers were asked during how many of the past 10 years they experienced various mental health problems related to DSM-IV disorder categories. We classified these problems as follows: “times lasting two weeks or longer when you were so sad or depressed that you had problems with sleeping, eating, concentrating, or

not having enough energy” and “times lasting a few days or longer when you felt unusually high and full of energy” as any affective disorder, “times lasting several months or longer when you were so nervous or anxious that you had problems with sleeping, eating, or concentrating” and “anxiety attacks when all of a sudden you felt frightened, anxious, or panicky” as any anxiety disorder, “attacks of anger when all of a sudden you lost control and either broke something, hurt someone, or threatened to hurt someone” as any behavior disorder, and “problems with drinking alcohol” and “problems with drugs” as any substance use disorder. We considered a certain mental disorder as present when the mothers reported the symptoms during at least 1 year out of the past 10 years.

2.3 | Assessment of service use

Information on adolescent lifetime mental health service use across multiple sectors was obtained from adolescents and mothers using items based on the Service Assessment for Children and Adolescents.³³ Reports from both informants showed acceptable levels of agreement.¹² Participants were asked whether the adolescents had ever made use of any services from professionals or institutions for problems with emotions, behavior, or substance use. Service use was classified into the following sectors according to previous studies:^{12,34} (a) mental health specialty sector, including community mental health centers, mental health professionals, partial hospitalization or day treatment programs, drug or alcohol clinics, hospitals, and residential treatment centers, (b) medical specialty sector, including emergency rooms, pediatricians, and family doctors, (c) school service sector, including special classrooms or schools for children with emotional or behavioral problems, individual or group psychological counseling or therapy, and (d) other service sectors, including telephone hotlines, self-help groups, counselors or family preservation workers, probation or juvenile corrections officers or court counselors, respite care providers, spiritual advisors, group homes, foster homes, detention centers/prisons, and emergency shelters. We considered service use within a specific sector as present if either mother or adolescent reported service use within this sector. Moreover, participants were asked how old the adolescents were the first time they used each of the reported services. The answer to this question indicated the age of first mental health service utilization. If participants used services from more than one professional or institution within a sector, the earliest reported age was considered the age of first service use within this sector.

2.4 | Statistical analyses

All statistical analyses are based on weighted data^{27,28} and were conducted using Stata/MP 13.1 (Stata Corporation, College Station, TX). Descriptive statistics include frequencies and percentages of the sociodemographic characteristics of the study sample, maternal mental disorders, and adolescent mental health service use in the different sectors, as well as means and 95 percent confidence intervals (CI) for the average treatment delay per sector. To estimate relationships between maternal mental disorders and offspring mental health service

use after first onset of any mental disorder, we calculated separate discrete-time proportional hazard models with a non-parametric baseline hazard function using complementary log-log regression.³⁵ Each of the different maternal mental disorders and “any mental disorder” (yes, no) were included as time-invariant predictor, service use of adolescents per sector, including “any service sector,” (yes, no) as outcome, and “treatment delay” as time-to-event. Treatment delay was defined as the difference in years between age of onset of any mental disorder and age of first service use per sector or, in case of censoring, as the difference in years between age of onset of any mental disorder and age at the time of survey. For subjects who reported service use before age of onset of any mental disorder (details are presented in the footnote of Table 2), we defined treatment delay as 0 years. We present hazard ratios and 95 percent confidence intervals. To estimate the association between maternal mental disorders and mental health treatment delay among those participants who reported service use, we calculated separate negative binomial regression models,³⁶ appropriate for non-normally distributed right-skewed over-dispersed count data. We defined each of the different maternal mental disorders and “any mental disorder” (yes, no) as predictor and each of the continuous treatment delay variables per sector, including “any service sector,” as outcome. We present incidence rate ratios (IRR), exponentiated regression coefficients, which are interpreted as factor change in the outcome variable for each unit increase in the predictor variable, and 95 percent confidence intervals. To take account of the complex structure of data, we used the Taylor Series Linearization method.³⁷ We repeated our analyses to control for confounders by including sociodemographic variables (according to categories presented in Table 1), considered in previous epidemiological studies,^{12,14,38} in the regression models. Adjusted results are presented. To account for the large number of tests, we controlled the false discovery rate,³⁹ implemented in R (R Project for Statistical Computing, <http://www.r-project.org>), and corrected *P*-values accordingly. For a number of subjects, information on maternal mental disorders, adolescent service use, or sociodemographic covariates was missing. Therefore, we restricted our analyses to participants with complete data. Sizes of the completer subsamples are given in the footnotes of Tables 2-4, and Tables S2 and S3. We set the statistical significance level at 0.05 and calculated two-sided tests.

3 | RESULTS

3.1 | Study sample descriptives

The sociodemographic characteristics of the study sample (*N* = 2939) are described in Table 1.

3.2 | Prevalence of maternal mental disorders, adolescent service use, and treatment delay

Prevalence estimates of maternal mental disorders, adolescent mental health service use, and sector-specific treatment delays after first onset of any mental disorder are described in Table 2. 1263 (48.98 percent) of 2633 mothers reported any mental disorder. Prevalence

estimates of lifetime service use among adolescents with any mental disorder ranged between 9.32 percent in the medical specialty sector and 51.51 percent in any service sector. Treatment delays were lowest in any service sector and highest in the medical specialty sector, with means ranging from 3.65 to 5.41 years. For reasons of transparency, prevalence estimates of adolescent mental disorders, ages of onset of adolescent mental disorders, prevalence estimates of adolescent any mental health service use, and mental health treatment delay after first onset of adolescent mental disorders are presented in Table S1.

3.3 | Association between maternal psychopathology and adolescent service use

Results of the discrete-time proportional hazard models for maternal mental disorders predicting offspring mental health service use after first onset of any mental disorder are presented in Table 3, with hazard ratios ranging between 1.39 and 2.17 after correction for multiple testing. Offspring mental health service utilization was predicted by all maternal disorders included in our study across various service sectors. Estimates were highest for the mental health specialty sector, other services, and any service sectors, and were also found for the medical specialty sector. No associations were found for the school service sector. For reasons of transparency, results of the crude regression models are presented in Table S2.

3.4 | Association between maternal psychopathology and adolescent treatment delay

Results of the negative binomial regression models for maternal mental disorders predicting mental health treatment delay after first onset of any mental disorder are presented in Table 4. After correction for multiple testing, the associations between any behavior disorder and treatment delay in the mental health specialty (IRR = 1.44, 95 percent CI = 1.13-1.84), the medical specialty (IRR = 1.61, 95 percent CI = 1.26-2.06), and in any service sector (IRR = 1.32, 95 percent CI = 1.11-1.56) remained significant. For reasons of transparency, results of the crude regression models are presented in Table S3.

4 | DISCUSSION

This study, based on data from 2939 adolescents of a nationally representative survey, provides hitherto-unknown estimates of the association between various maternal mental disorders and the prevalence of and delays in mental health service use across multiple service sectors in offspring with mental disorders. Results indicate that the likelihood of service use is higher among offspring of mothers with mental disorders as compared to mothers without.

TABLE 1 Sociodemographic characteristics of the study sample (N = 2939)^a

Sociodemographic factor	Category	n	Weighted %
Age mothers (n = 2843) ^b	28-40 y	891	31.51
	41-44 y	718	25.84
	45-48 y	583	20.42
	49-68 y	651	22.22
Age adolescents	13-14 y	1133	34.61
	15-16 y	1124	41.90
	17-18 y	682	23.50
Sex adolescent	Female	1559	50.20
	Male	1380	49.80
Race adolescent	Hispanic	358	14.34
	Black	512	15.29
	Other	163	5.15
	White	1906	65.22
Parental education (highest level of either parent)	Less than high school	350	13.00
	High school	882	29.57
	Some college	675	23.33
	College grad	1032	34.10
Poverty index ratio	≤1.5 (poor)	444	16.29
	≤3	580	20.17
	≤6	988	32.93
	>6	927	30.61
Region	Northeast	529	16.18
	Midwest	982	25.12
	South	926	34.23
	West	502	24.47
Urbanicity	Metro	1191	45.01
	Other urban	1068	40.76
	Rural	680	14.23
Number of biological parents living with the adolescent	0	106	3.29
	1	1315	45.70
	2	1518	51.01
Birth order	Oldest	989	37.65
	Youngest	868	26.86
	Others	1082	35.48
Number of siblings	0	121	4.20
	1	796	27.14
	2	809	29.89
	3 or more	1213	38.77

^aSubsample of the NCS-A including all participants providing self- and mother-reported information on mental disorders and fulfilling DSM-IV criteria for any lifetime mental disorder.

^bSubsample of mothers differs due to missings in age variable.

TABLE 2 Prevalence estimates of maternal mental disorders, adolescent service use, and delays in service use after first onset of any mental disorder in different sectors (N = 2939)

Maternal mental disorder class		n	Weighted %	
Any affective disorder		1067	41.29	
Any anxiety disorder		818	30.26	
Any behavior disorder		154	6.64	
Any substance use disorder		188	9.16	
Any mental disorder		1263	48.98	

Service sector	n	Weighted %	Mean treatment delay in years ^a	95% confidence interval
Mental health specialty sector	954	32.95	3.89	3.53-4.26
Medical specialty sector	277	9.32	5.41	4.76-6.07
School service sector	780	28.39	4.35	3.98-4.71
Other service sector	582	21.36	5.23	4.65-5.81
Any service sector	1430	51.51	3.65	3.40-3.89

Notes: All analyses were run in completer subsamples, based on the main sample of mother-adolescent dyads (N = 2939). Sizes of the subsamples are as follows: maternal affective disorder: n = 2631; maternal anxiety disorder: n = 2634; maternal behavior disorder: n = 2227; maternal substance use disorder: n = 2670; maternal any mental disorder: n = 2633; mental health sector: n = 2890; medical sector: n = 2907; school sector: n = 2857; other sector: n = 2871; any sector: n = 2855.

^aMean treatment delays were calculated only among participants who used any service per sector. For subjects who reported service use before age of onset of any mental disorder (mental health specialty sector: n = 112; medical specialty sector: n = 13; school service sector: n = 74; other service sector: n = 36; any service sector: n = 197), we defined treatment delay as 0 years. Sizes of the subsamples are as follows: mental health sector: n = 919; medical sector: n = 260; school sector: n = 750; other sector: n = 548; any sector: n = 1405.

TABLE 3 Discrete-time proportional hazard models for maternal mental disorders predicting adolescent lifetime mental health service use after first onset of any mental disorder in different sectors

	Mental health specialty sector		Medical specialty sector		School service sector		Other service sector		Any service sector	
	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI	HR	95% CI
Any affective disorder	2.17***	1.66-2.82	1.78*	1.09-2.90	1.03	0.71-1.49	1.75***	1.29-2.38	1.41**	1.09-1.82
Any anxiety disorder	1.70**	1.23-2.36	1.37	0.77-2.46	1.35	0.99-1.84	1.88***	1.43-2.48	1.39**	1.09-1.77
Any behavior disorder	1.73***	1.30-2.31	2.05**	1.24-3.39	1.41	0.81-2.47	1.97*	1.17-3.33	1.60**	1.15-2.21
Any substance use disorder	1.81**	1.20-2.75	1.08	0.55-2.11	1.00	0.65-1.53	1.94***	1.35-2.79	1.57*	1.09-2.24
Any mental disorder	2.13***	1.53-2.97	1.89*	1.05-3.40	1.23	0.87-1.73	1.60**	1.19-2.16	1.46**	1.12-1.89

Notes: All analyses were run in completer subsamples, based on the main sample of mother-adolescent dyads (N = 2939). Sizes of the subsamples are: affective/mental health: n = 2498; affective/medical: n = 2524; affective/school: n = 2473; affective/other: n = 2482; affective/any: n = 2479; anxiety/mental health: n = 2500; anxiety/medical: n = 2526; anxiety/school: n = 2475; anxiety/other: n = 2482; anxiety/any: n = 2480; behavior/mental health: n = 2107; behavior/medical: n = 2130; behavior/school: n = 2083; behavior/other: n = 2093; behavior/any: n = 2087; substance/mental health: n = 2533; substance/medical: n = 2559; substance/school: n = 2508; substance/other: n = 2515; substance/any: n = 2511; any mental/mental health: n = 2499; any mental/medical: n = 2524; any mental/school: n = 2471; any mental/other: n = 2482; any mental/any: n = 2478. Analyses are adjusted for maternal age, sex, age, race, parental education, poverty index ratio, region, urbanicity, number of biological parents living with the adolescent, birth order, and number of siblings. HRs with significant P-values after correcting for multiple tests using the false discovery rate are marked in bold.

CI, confidence interval; HR, hazard ratio; *, P-value < 0.05; **, P-value < 0.01; ***, P-value < 0.001.

Maternal mental disorders predicted offspring mental health service use across various service sectors, except for school services. In the mental health specialty sector, estimates were highest for maternal affective and any mental disorders. For offspring use of any mental

health services, estimates were highest for maternal behavior and substance use disorders. Maternal psychopathology was mostly unrelated to treatment delays in the offspring, except for maternal behavior disorders that were linked with longer delays in the mental

TABLE 4 Negative binomial regression models for maternal mental disorders predicting adolescent mental health treatment delay in different sectors

	Mental health specialty sector		Medical specialty sector		School service sector		Other service sector		Any service sector	
	IRR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI	IRR	95% CI
Any affective disorder	1.06	0.83-1.35	1.14	0.91-1.44	1.10	0.84-1.45	1.14	0.91-1.43	1.08	0.86-1.36
Any anxiety disorder	1.05	0.84-1.33	1.23	0.97-1.57	1.08	0.87-1.36	1.27*	1.04-1.56	1.09	0.91-1.32
Any behavior disorder	1.44**	1.13-1.84	1.61***	1.26-2.06	1.12	0.77-1.63	1.33	0.96-1.83	1.32**	1.11-1.56
Any substance use disorder	1.31	0.89-1.94	0.94	0.65-1.38	0.86	0.61-1.21	1.00	0.75-1.32	1.18	0.88-1.57
Any mental disorder	1.09	0.87-1.38	1.18	0.93-1.51	1.12	0.87-1.44	1.14	0.89-1.46	1.07	0.88-1.30

Notes: All analyses were run in completer subsamples, based on the main sample of mother-adolescent dyads (N = 2939), and were restricted to those participants who reported any lifetime service use per sector (see Table 2). Sizes of the completer subsamples are as follows: affective/mental health sector: n = 811; affective/medical sector: n = 231; affective/school sector: n = 647; affective/other sector: n = 468; affective/any sector: n = 1227; anxiety/mental health sector: n = 807; anxiety/medical sector: n = 228; anxiety/school sector: n = 643; anxiety/other sector: n = 465; anxiety/any sector: n = 1222; behavior/mental health sector: n = 633; behavior/medical sector: n = 174; behavior/school sector: n = 512; behavior/other sector: n = 360; behavior/any sector: n = 988; substance/mental health sector: n = 818; substance/medical sector: n = 230; substance/school sector: n = 656; substance/other sector: n = 475; substance/any sector: n = 1239; any mental/mental health sector: n = 809; any mental/medical sector: n = 230; any mental/school sector: n = 648; any mental/other sector: n = 467; any mental/any sector: n = 1226. Analyses are adjusted for maternal age, sex, age, race, parental education, poverty index ratio, region, urbanicity, number of biological parents living with the adolescent, birth order, and number of siblings. IRRs with significant *P*-values after correcting for multiple tests using the false discovery rate are marked in bold.

CI, confidence interval; IRR, incidence rate ratio; *, *P*-value < 0.05; **, *P*-value < 0.01; ***, *P*-value < 0.001.

health specialty, medical specialty, and any service sector use as compared to offspring of mothers without behavior disorders.

Our finding that maternal psychopathology was associated with an increased likelihood of mental health service use in the offspring is generally in line with previous studies^{19,20,23-26} which, however, included non-representative samples^{20,25,26} and focused on, or did not differentiate between, specific child or parental mental disorders^{19,20,23-26} and service sectors.^{20,24,25} The association has been best-documented for parental substance abuse,^{20,26} depression,^{24,25} and anxiety,^{20,25} and the mental health specialty sector.^{19,23} Teagle and colleagues²³ report that parental history of psychopathology predicted offspring service use in the mental health specialty, but not in the school service sector, which is consistent with our findings. Angold et al⁴⁰ found only a small association for parental burden predicting school service use and hypothesized that school services might be more sensitive to the severity of the child's symptoms than to parental characteristics, because children might be able to make contact with school-based services without the help of their parents. Another study⁴¹ reported increased mental health service use rates when children entered school, conceivably because at that point mental health care needs come to the attention of a care provider, less biased by parents' psychopathology and service use decisions.

Our findings that maternal behavior disorders predicted longer treatment delays in the mental health specialty, the medical specialty, and in any service sector, are generally in line with studies suggesting that parental psychopathology may increase the risk of higher unmet service needs in the offspring.^{20,21} However, in

contrast to Cornelius and colleagues,²⁰ we did not find such an association for parental substance use disorders.

Although the mechanisms of the association between parental psychopathology and increased offspring service use have been poorly understood, several potential pathways have been discussed. First, child service use is predicted by the parents' perception of children's mental health problems and needs and the impact on the family.^{19,23,25} It has been shown that mothers experiencing stress or depression tended to perceive child behaviors as more problematic than well-adjusted mothers.²² A lower threshold for perceiving and evaluating the child's emotional and behavioral problems as in need of treatment might lead to increased service use in children of mothers with mental disorders.²³ Second, children of parents with mental disorders are confronted with fewer barriers to help-seeking, especially when parents or other family members have already received treatment for their mental health problems, the latter of which has been found to be associated with increased child service use.²⁴ Children of parents treated for their mental disorders may profit from more accepting and less stigmatizing parental attitudes toward mental health treatment.⁴² Moreover, children of parents with mental disorders may be less likely to believe the problem would spontaneously remit or they can solve it on their own; both beliefs have been found to represent frequent barriers to help-seeking.⁴³ Third, the estimated association between maternal mental disorders and adolescent mental health service use may be mediated by child disorder severity.¹⁹ Previous studies reported that children of parents with mental disorders developed more severe mental disorders, as

compared to children of parents without mental disorder history.⁸ A positive correlation between mental disorder symptom severity and mental health service use has been documented.¹² This third pathway might also explain our finding that school service use was not predicted by maternal psychopathology, as the school service sector may be an entrance point for young people with less severe mental disorders.⁴⁴ The mechanisms underlying the finding that maternal behavior disorders predicted offspring treatment delay across several service sectors remain to be determined. One might speculate that, as the item used to assess maternal behavior disorder included a description of antisocial behaviors, those mothers might possess maladaptive parenting skills (eg, lack of empathy⁴⁵) which may hinder them to perceive their children's needs and arrange for mental health services at an early stage of disorder.^{19,23,25}

Our study has several strengths, including the use of weighted data from a large nationally representative sample of United States adolescents.^{27,29} The fully structured WHO CIDI covering a wide spectrum of DSM-IV mental disorder categories and showing good quality criteria³⁰ was used to assess adolescent mental disorders, and diagnostic information from adolescents and mothers was combined.⁴⁶ Adolescent mental health service use was assessed with a well-established instrument³³ and across multiple service sectors. This study encompasses a broad spectrum of maternal mental disorder categories.

Our results may be interpreted in lights of several limitations; the ones concerning the NCS-A have been previously discussed.^{12,29} First, we included only mothers to examine the association between parental psychopathology and adolescent mental health service use, as more than 80 percent of parents or guardians who completed the SAQ were biological mothers. This percentage is consistent with previous studies investigating health care issues in children and reporting that mostly mothers make service use decisions.⁴⁷ Second, for the definition of maternal psychopathology, mothers had to report DSM-IV-related mental health problems during at least one out of the past 10 years, which does not represent the gold standard of assessment of mental disorders using a standardized clinical interview,^{48,49} and might have led to biased prevalence estimates of maternal mental disorders. Even though estimates were mostly in line with those reported in previous studies,^{1,15} we cannot fully exclude selection bias, according to which previous experience of a specific maternal mental disorder may have led to an overreporting of additional mental disorders. Third, offspring mental health problems may have been overreported by mothers with own mental health problems.⁵⁰ However, as the presence of offspring mental disorder was not a study outcome, it is unlikely that potential overreporting of those offspring mental disorders (ie, attention-deficit/hyperactivity disorder, conduct disorder, oppositional defiant disorder, major depressive disorder, and dysthymic disorder) for which diagnostic information was collected from biological mothers in the SAQ, in addition to diagnostic information collected directly in WHO CIDI interviews with the adolescents, may have had an impact on our results. However, it may have affected the generalizability of our findings. Fourth, service utilization was assessed retrospectively

by adolescent and maternal self-report, which is susceptible to recall bias, and even though the agreement of both informants was acceptable in the sample of 6483 NCS-A participants for which parental SAQ was available,¹² in our study sample of 2939 participants, discrepancies might have reduced the reliability of results. Fifth, we did not distinguish between participants who reported service use before first onset of any mental disorder and those with treatment delays of 0 years, which would have been beyond the scope of our work but may be an interesting research question for future studies. Sixth, as compared to the 10 123 NCS-A participants at school at the time of survey, parental SAQ was available only for 6483 adolescents, resulting in a loss of 3640 participants. Therefore, in our study sample of 2939 participants (at school at the time of survey, maternal SAQ available, and any lifetime DSM-IV mental disorder), we cannot exclude potential selection bias, even though we considered this using poststratification weighting for our analyses, with weights taking into account a wide range of sociodemographic variables.

Our findings implicate that public education campaigns designed to raise awareness toward mental disorders⁵¹ should specifically address parents without mental disorders. Those might be less likely to notice their children's mental health treatment needs, and barriers to help-seeking such as stigmatizing attitudes toward mental disorders and treatment might prevent them from contacting mental health professionals for their offspring's disorders.⁵² Universal screening in general medical and pediatric settings and in schools may help to detect unmet mental health service needs in children and adolescents who are not primarily considered at high-risk for the development of mental disorders due to a history free of parental psychopathology.²³ Schools ought to take advantage of their crucial importance as entrance gate and point of referral to subsequent mental health service sectors,^{34,44,53} and should, for instance, educate adolescents about positive aspects of help-seeking for mental health problems,⁵⁴ especially because school service use seems to have the advantage of being unbiased by parental psychopathology.

Future studies should aim at identifying patterns underlying parental decision making on offspring service use, preferably in longitudinal studies, elucidating whether the increased likelihood of mental health service use in offspring of parents with mental disorders represents actual treatment needs or whether parental psychopathology may inflate parental perception of their children's emotional and behavioral symptoms. As we did not distinguish between various adolescent mental disorders, future studies should examine if the patterns found in our study vary between offspring disorder categories, as former research implies.¹²

To the best of our knowledge, this is the first comprehensive study investigating the association of various maternal mental disorders with mental health service use by offspring with mental disorders and with offspring treatment delays across multiple service sectors. Results indicate that offspring of mothers with mental disorders, as compared to offspring of mothers without mental disorders, is more likely to make use of service in all service sectors, except for the school service sector. Treatment delays were mostly unrelated

to maternal psychopathology, except for maternal behavior disorders in the mental health specialty, the medical specialty, and in any service sector. Our results highlight the relevance of maternal mental health for offspring mental health care utilization and suggest that the consideration of maternal mental disorder status may help to improve the early identification and prevention of unmet needs in the treatment of mental disorders.

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CONFLICT OF INTEREST

GM has been acting as consultant for Janssen Research & Development, LLC. The authors declare that no conflicts of interest exist.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

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