TREATED PREVALENCE, INCIDENCE, AND PHARMACOTHERAPY OF CHILD AND ADOLESCENT MOOD DISORDERS IN AN HMO

by

Lynn Larson DeBar, Ph.D.

A THESIS

Presented to the Department of Public Health and Preventive Medicine and the Oregon Health Sciences University School of Medicine in partial fulfillment of the requirements for the degree of Master of Public Health

December 1999

School of Medicine

Oregon Health Sciences University

CERTIFICATE OF APPROVAL

This is to certify that the MPH thesis of

Lynn Larson DeBar

has been approved

[redacted]

Professor in charge of thesis

[redacted]

Member

[redacted]

Member

[redacted]

Member

Table of Contents

Table of Contents..... i

List of Tables.....ii

List of Figures.....iii

Acknowledgements.....iv

Abstract.....v

Introduction.....1

Methods.....9

Results.....15

Discussion.....27

Summary and Conclusions.....39

References.....40

List of Tables

Table 1: Classification of Diagnostic Groups.....11

Table 2: Treatment Prevalence of Mood Disorders Among Youth.....16

Table 3: Treatment Incidence of Mood Disorders Among Youth.....17

Table 4: Healthcare Visits During 1998 by Gender.....20

Table 5: Children and Adolescents Receiving Psychiatric Medication Within 30 Days of Incident Mood Disorder Diagnosis.....22

Table 6: Predictors of Psychotropic Medication Dispenses for Youth Mood Disorders.....23

Table 7: Mean Number and Standard Deviation of Health Care Visits by Youth with at Least One Health Care Visit during the Study Time Frame.....24

Table 8: Estimated Regression Coefficients for Predicting the Effects of Identified Mood Disorders in Youth on Log Health Care Utilization Rates Controlling for Demographic Factors.....26

List of Figures

Figure 1: Treatment Incidence of Mood Disorder By Gender.....18

Acknowledgements

I would like to thank my thesis committee for their careful comments, encouragement, and support – Gregory Clarke, Bentson McFarland, Clyde Pope, and, particularly, Donald Freeborn, who served as chair. I also am grateful to Gregory Clarke and Elizabeth O'Connor with whom I collaborated in designing the project and creating the data set on which this project was based. Carla Green, Michael Polen, and Myde Boles provided invaluable feedback on earlier versions of this manuscript. Thank you all.

ABSTRACT

There is little information regarding the treated prevalence and incidence of childhood and adolescent mood disorders in medical care settings. In addition, there is little information available regarding the use of pharmacotherapy for childhood and adolescent mood disorders. This study examined the rates of treated mood disorders as well as rates and characteristics of pharmacotherapy among children and adolescents in a large health maintenance organization (HMO). The study included information from primary and specialty medical care settings as well as specialty mental health. A search of HMO electronic medical records for 1998 yielded 1,823 youth ages 3 to 17 with mood disorders, representing 0.1% of preschool children (3 – 5 years of age), 1.4% of latent-age children (6 - 11 year olds), and 5.6% of adolescents (12 – 17 years of age) who had at least one healthcare visit in this time period (n=59,632). Although younger children with identified mood disorders were fairly evenly divided between males and females, female adolescents with mood disorders were identified approximately twice as often as their male counterparts in this healthcare setting. Medical practitioners in nonmental health settings identified a substantial proportion of these mood disorders (43.1%). More than a third of the youth (38.8%) identified with an incident mood disorder were given psychotropic medication within 30 days of receiving the mood disorder diagnosis. The majority of these prescriptions were for selective serotonin reuptake inhibitors (SSRIs) (83.2%). Multivariate analyses including only youth 6-17 years of age demonstrated that older youth (OR=1.21, 95% CI 1.15-1.26), those identified in primary care (OR=4.16, 95% CI 3.23-5.35), and those with diagnoses indicating more severe mood disorders

(OR=2.47, 95% CI 1.64-3.72) were most likely to be prescribed antidepressant medication. Youth (6-17 years of age) with mood disorders also used significantly more medical and specialty mental health services than youth without any identified mood disorders, after controlling for the effects of age, sex, and Medicaid status. The high use of SSRIs and treatment within primary care settings parallels practice patterns reported in adults.

INTRODUCTION

Depression is one of the most common mental disorders among adolescents, with an estimated point prevalence of 3% to 8% in community epidemiology samples.[1] Recent studies have also found evidence for a secular increase in depression among children and adolescents paralleling that described in adult populations.[2] By age 18, as many as 25% of adolescents have had at least one depressive episode.[3] Despite relatively high rates of depression in the general adolescent population, only a minority of these youth ever receive treatment.[4]

These data, while valuable, have generally been obtained via community-based epidemiological studies which address the question "Among all depressed youth, what is the rate (and perhaps type) of treatment?" Very little information exists regarding the inverse of this question: "Among youth treated for all health problems, what proportion are treated for depression?" This includes data on the frequency of depressed youth in treatment facilities, the type of health care providers that treat them, and the treatments they receive. The aim of this study is to address the treated prevalence and incidence of child and adolescent mood disorders (i.e., those diagnosed with a mood disorder by their medical provider) in a large, nonprofit, group-model health maintenance organization (HMO). Further, this report examines the setting in which such youth are seen (primary and specialty medical care versus specialty mental health), the rate and type of pharmacotherapy these youth receive, and the association of youth mood disorders with healthcare utilization in these settings.

Prevalence and Incidence

Previous epidemiological studies typically start with a representative community

sample of youth in which mental health service utilization is reported for those who are identified with depression or other mental health problem.[3,5-10] Data regarding health service utilization is often obtained by parent and/or youth self-report, and rarely from more reliable medical charts or administrative databases.

Among recent epidemiological studies, the lifetime prevalence of depression in adolescents is estimated to be comparable to the range found in adult populations (15%-20%), suggesting that adult depression may often begin in adolescence.[11] Rates of depression increase with age, starting with a point prevalence between 0.4% and 2.5% before age 12 and increasing from puberty onward up from 0.4 to 9.6% by eighteen years of age.[1,3] The one-year incidence of major depressive disorder in a community sample of adolescents has been reported to be as high as 7.8%.[12] No recent information on incident rates of mood disorders in children younger than twelve years of age could be located in the literature reviewed.

Health Service Utilization among Youth with Mood Disorders

A few recent studies have examined health service utilization patterns among youth with mood disorders or with psychiatric disorders more generally. Similar to studies of incidence and prevalence rates, these reports have generally used community epidemiology methods to identify youth with diagnosable psychiatric conditions. These studies have also generally relied on parent and/or youth self-report to determine health care utilization.

In the Great Smoky Mountains Study, investigators found that 20% of 9 - 13 year-olds met criteria for a psychiatric disorder.[13-15] However, children with mood disorders were not distinguished from those with other types of psychiatric conditions. Nor was

mental health-related health service utilization reported separately for those with and without psychiatric disorders. Of the 21% of the sample that received some type of service to address a mental health problem, most of these services were from the educational sector (12%), with fewer youth receiving mental health specialty care (8%) or mental health-related services through the general medical sector (4%). Somewhat lower mental health service utilization rates (3.5%) were reported among a general population sample of children age 4 to 18 years of age.[16] Children from problem families were found to be over-represented among those referred for mental health services, as may also be true for clinical samples in general. Other researchers reporting on factors associated with mental health service use among young children (2 to 5 years of age), also note that those children experiencing more family conflict were more apt to enter treatment, as are those children who are older, white, more impaired, and those referred by a pediatrician for mental health specialty services.[17-18] Finally, in a recent report from the NIMH Methods for the Epidemiology of Child and Adolescent Mental Disorders (MECA) Study, children identified with depressive disorders did not use significantly more mental health services than those without an identified psychiatric disorder and used significantly less than did children with disruptive disorders.[19] Yet while depressed children used fewer mental health services, they reported more need for services than did those with disruptive disorders. These findings suggest that depressed children are likely under-identified and under-referred for appropriate mental health-related services when compared to children with disruptive disorders. Collectively, these studies suggest that far fewer youth with psychiatric difficulties are receiving health care than could benefit from such services.

We can conclude little about the treatment of mood disorders, specifically, as most of the existing research has not distinguished mood disorders from other psychiatric conditions.

Pharmacotherapy among Youth with Mood Disorders

In recent years, a number of media reports have expressed concern about the increasing exposure of children to psychotropic medications. Medical researchers have also discussed the gap between what is known about the efficacy of these agents and how they are being used in clinical practice.[20-21] We review here both what has been recently reported regarding the efficacy of antidepressants in children, and the use of these agents in research and clinical settings.

Efficacy. Until very recently, research on the efficacy of pharmacotherapy for depression in children and adolescents has found weak, mixed or no treatment effects. Comprehensive reviews and meta-analyses suggest that several methodological problems, particularly inadequate sample size and insufficient dosing, have contributed to the failure to find positive medication effects.[11,22-24] Additionally, recent reports suggest that tricyclic and nontricyclic antidepressants as well as mood stabilizers need more study before concluding that they are either safe or efficacious for use with children and adolescents.[2,25-26] More promising results have been reported with the use of selective serotonin reuptake inhibitors (SSRIs). A recent randomized trial found significant positive effects for fluoxetine (Prozac) in a randomized, placebo-controlled trial with 96 youth (8-18 years) with major depression in which fluoxetine responders (56%) significantly outnumbered placebo responders (33%).[27] Another large, randomized trial of paroxetine (Paxil) for depressed youth is nearly complete, but outcome results are not yet available.[28] Finally, in a recent multicenter open-label sertraline study in adolescent

outpatients with major depression, significant improvement occurred early on and was maintained for 22 weeks.[29] Thus, there are now at least a few studies suggesting the efficacy and safety of SSRI's for use with mood disordered youth, but much less empirical support for the use of other psychotropic agents for depression.

Rates. Paralleling the incomplete efficacy literature, there is little information regarding rates of pharmacotherapy for childhood and adolescent depression. The few existing studies can be divided into two categories, reviewed in turn below: samples defined primarily for *research* studies, and studies focused on routine *practice* settings.

In a report on the treatment of 38 youth enrolled in the Collaborative Depression Study who had been identified with a research diagnosis of depression, only one depressed youth received pharmacotherapy (with an anti-anxiety agent), while another 16% (6/38) received psychotherapy.[30] In a longitudinal research study of course and outcome of 65 depressed children, only 3 cases (4.8%) received pharmacotherapy despite 63% of the youth receiving some form of treatment during their index depressive episode.[31]

More recent studies in practice settings suggest that rates of pharmacotherapy for youth with mood disorders are likely increasing over time. Researchers reviewing the charts for 1,400 child outpatients seen in a 1-month period in two public university affiliated settings in New York and Ohio found that the providers (primarily child psychiatrists) prescribed antidepressant medications for between 15% and 19% of the cases.[32] However, these prescriptions were not specific to depression but were for all mental health conditions, and did not include primary care providers. A survey of 238 British child psychiatrists regarding their medication prescribing practices found that

84% prescribed antidepressants.[33-34] Similar survey results were reported for British general practitioners and child psychiatrists.[35] Unfortunately, neither of the British studies validated these provider reports against actual prescription data. Investigators examining prescribing-rate data from two national databases based on surveys of office-based medical practices (included both primary and specialty care providers) found that SSRIs were the second most prescribed psychotropic to children and adolescents in 1995 (over one million drug mentions) and that the number of outpatient visits associated with SSRI prescription was second only to stimulants (358,616).[20] Anticonvulsant mood stabilizers (prescribed for a psychiatric reason), tricyclic antidepressants, and benzodiazepines were among those psychotropic agents also prescribed for a substantial number of office visits. These findings are consistent with those of another study that found a general TCA-to- SSRI shift during the 1990s.[36] While the use of SSRI medications by child psychiatrists appeared to be increasing (5% to 21% between 1988 to 1994), stimulant use among these same providers decreased (58% to 31% between 1988 to 1994).[36] Thus, the importance of antidepressant medication, particularly SSRI's in clinical settings appears to be increasing.

Medical Setting in Which Mood Disorders are Diagnosed and Treated

While there is growing discussion of the importance of recognizing and managing mood disorders in both adult[37-39] and pediatric primary care settings,[40] little empirical work has been done particularly on mood disorders treated in pediatric primary care settings. Adult studies suggest that depression is among the most common problems treated in primary care, with a prevalence rate of 5-10%,[38,41-42] but similar data has not been reported for children and adolescents. Studies have estimated that while major

depression occurs in 2% - 4% of persons in the community, it is found at more than double that rate among primary care patients.[41] Among pediatric populations, researchers from this HMO found some years ago that two-thirds of youth (those 18 years of age and younger) with diagnosable psychiatric conditions were treated exclusively by primary care providers (pediatricians or family practice providers).[43] Primary care has become the de facto mental health delivery system in the U.S., responding to most patient requests for mental health care.[44] In addition, the primary care providers serve a "gate-keeper" function in many managed care settings. For example, a recent study reported that, for adults, having a family practice physician as a personal primary care clinician was an important predictor of receiving a depression diagnosis, an antidepressant prescription, and referral to and use of specialty mental health care.[39] Thus, understanding the role of primary care as well as mental health specialty care, in treating mood disorders in children and adolescents is an important public policy issue.

No research has focused specifically on the use of services by children and adolescents with mood disorders enrolled in managed care. In 1995, almost 75% of insured Americans were enrolled in managed care organizations,[45] and many states have begun covering most or all of their Medicaid enrollees through managed care.[46] Although managed care organizations may increase initial access to basic mental health services,[47] managed care organizations may restrict access to needed specialty services to children with chronic health conditions including serious mental health problems.[48] Thus, better understanding patterns of care in these settings is important.

Study Aims

Examination of treatment patterns in managed care settings can provide important

information about the types and extent of services used by children and adolescents currently being treated for mood disorders. This report describes the "treatment" epidemiology of child and adolescent mood disorders (rate of mood disorder diagnoses by medical providers), in a large, nonprofit, group-model HMO. Six questions are addressed: (1) What are the "treatment" prevalence and incidence rates for children and adolescents with mood disorders? (2) Which healthcare providers (i.e., primary care or mental health specialty) are most likely to identify mood disorders in children and adolescents, (3) In what settings are children and adolescents with recognized mood disorders provided services? (4) What proportion of these identified children and adolescents receive psychotropic medication, which medications, and prescribed by whom? (5) What factors best predict which children and adolescents with identified mood disorders will receive pharmacotherapy? (6) Finally, do children and adolescents with identified mood disorders use more health care services than do those children without evidence of a mood disorder?

METHODS

Research Setting

The Northwest Division of Kaiser Permanente (KPNW) is the third largest of 12 semi-autonomous regions of Kaiser Permanente's nonprofit group model HMO, providing both outpatient and inpatient care to approximately 430,000 members in Northwest Oregon and Southwest Washington. The demographic characteristics of the KPNW population are similar to those of the community it serves.[49]

The prepaid health plan benefits in KPNW include complete coverage for physician, hospital, laboratory, and radiology services. KPNW provides continuity and coordination of care through offering extensive primary and specialty care services covering a broad range of educational, screening, diagnostic, treatment, and rehabilitation services. Over 90% of members have a prescription drug benefit, and prescription drugs are provided at reduced charge to members without a drug benefit. Mental health care received in the primary care setting is covered under members' medical benefits, rather than by their mental health benefits. Ninety-six percent of health plan members have mental health benefits; the level of benefits vary, but are generally as good or better than those offered by other U.S. HMOs.[50] HMO members may self-refer to the HMO's specialty mental health department or be referred by their primary care clinicians. In 1992, 3.4 percent of the HMO's members made at least one outpatient visit to a specialty mental health clinician.[38]

Medicaid members have comprehensive medical benefits that cover a wide range of inpatient and outpatient services and prescription drugs; however, specialty mental health services are "carved out" of the Medicaid benefit package. As required by state

law, coverage for mental health specialty services for Medicaid members is provided by other state-contracted organizations rather than by KPNW. However, a number of mental health-related services are still provided under the physical health contract. Medication management, diagnosis and consultation, and any mental health services provided through general medical providers are available from KPNW to all Medicaid enrollees.

Sample and Case-Finding Procedures

To collect mood disorder diagnoses on our cohort of children and adolescents we used the outpatient electronic medical record system, EpiCare, used by all KPNW providers during health care visits. EpiCare maintains a database of all outpatient encounters including orders for medications, laboratory tests, radiology procedures, and diagnoses for each encounter. For this study, we collected data on 12 months of mood disorder diagnoses and health service use on all children and adolescents from 3 through 17 years of age who were continuously enrolled at KPNW between January 1, 1998 and December 31, 1998 (N=81,137). This included data from all primary medical care clinics (pediatrics, family practice, health appraisal clinic, and urgent care), specialty medical care clinics (all other outpatient medical clinics used by youth), and KPNW specialty mental health care clinics in the region. We also identified and included the proportion of these children who were enrolled in Medicaid during any portion of the study year (N=10,625, 11.3%). We grouped children and adolescents according to whether they had an outpatient diagnosis of bipolar disorder, major depression, dysthymia, adjustment disorder with depressed mood, depression not otherwise specified, or no mood disorder diagnosis. The psychiatric ICD-9-CM codes used to define these groups are shown in Table 1. Although it was possible for an individual to have more than one of these

Table 1 - Classification of Diagnostic Groups

Study Classification	*EpiCare Classification*	*Corresponding ICD-9 Class*	*ICD-9 Code*
Bipolar disorder	Bipolar I (manic, depressed, and mixed episodes of varying severity)	Manic disorder, Bipolar affective disorder	296.00-296.05, 296.4-296.45, 296.50 – 296.55, 296.6 – 296.65, 296.7, 296.8, 296.89
Major depressive disorder	Major depressive disorder	Major depressive disorder	296.2 – 296.25, 296.3 – 296.35
Dysthymia / subclinical depressed mood	Dysthymic disorder	Neurotic depression	300.4
Adjustment disorder w/depressed mood	Adjustment disorder w/depressed mood	Brief depressive reaction	309.0
Depression, not otherwise specified	Atypical depressive disorder, Mood disorder NOS, Prolonged depressive reaction, Depressive disorder NOS	Atypical depressive disorder, Unspecified affective psychoses, Prolonged depressive reaction, Depressive disorder NOS	296.82, 296.9, 309.1, 311

diagnoses, diagnostic status was assigned to a single category using one of two procedures. First, a code was created to identify the first mood disorder diagnosis received by the subject during the study period. In addition, a second code was created to identify the most severe mood disorder coded for a particular subject during the study year (i.e., bipolar disorder > major depressive disorder > dysthymia > adjustment disorder with depressed mood > depression not otherwise specified). Data was also collected on the total number of health care visits made by each subject over the study year including, primary care visits, specialty medical care visits, and specialty mental health care visits. In addition, data on subjects' health service utilization and depression-related diagnoses for the six months preceding the study window was collected to identify "incident" depressive episodes. Those subjects who were continuously enrolled in the health plan and had no diagnosed mood disorder in the six months preceding the study window (7/01/97 – 12/31/97) but had a mood disorder diagnosis recorded during the 1998 study window, were defined as having had an incident episode of a mood disorder, for the purposes of this report.

Data on Psychotropic Medication

Among cases identified with a mood disorder, a separate HMO pharmacy database was searched for psychotropic agents that were dispensed within 30 days of an incident mood disorder diagnosis. Our analyses indicate that for youth that receive psychotropic medications within six months of an incident mood disorder diagnosis, 85% of these medications are dispensed within 30 days of the diagnosis. Medications were classified as selective serotonin reuptake inhibitor (SSRIs), tricyclic antidepressants (TCAs), other antidepressants (i.e., bupropion, nefazodone, trazodone, and venlafaxine),

benzodiazepines, and mood stabilizers (i.e., lithium, valproic acid, or carbamazepine). No youth received MAO Inhibitor or heterocyclic medications; thus, these agents were not included in study analyses.

Analysis

Prevalence and incidence rates were determined both as a proportion of the total number of medical plan members 3 to 17 years of age as well as the proportion of all medical plan members of this age range with health care visits during the study time frame. For the purpose of these analyses, subjects were grouped into three age ranges: preschool (3-5 years of age), latent-age (6-11 years of age), and adolescence (12-17 years of age). Age was calculated as subject age as of the beginning of the study window (1/1/98). Incidence rates were also computed year by year from 10 to 17 years of age to determine whether there were discrepant changes in rates between males and females during the early adolescent years as reported in community epidemiology studies. A Chi-square analysis was used to determine differences in the proportion of youth identified with mood disorders through medical and specialty mental health settings. Since Medicaid youth were not eligible for mental health services within the HMO, analyses specifically examining rates of mental health visits only included non-Medicaid youth. All other analyses included both Medicaid and nonMedicaid youth.

To determine whether patient or treatment characteristics were associated with receiving a psychotropic medication, a logistic regression model was specified. The model included sex, age, mood disorder diagnosis, type of provider initially identifying mood disorder, and Medicaid status as predictor variables. Finally, after describing mean amounts of health care utilization for youth across service sector, two linear regression

models were constructed to examine the contribution of a mood disorder diagnosis to amount of medical and specialty mental health care utilization respectively. In the first model the dependent variable was the amount of outpatient medical care utilization (both primary care and specialty medical care). Utilization of specialty mental health care was not included in the medical care overall utilization variable because individuals covered by Medicaid are not eligible for such services. In the second model, the dependent variable was the amount of outpatient specialty mental health care utilization; this analysis was restricted to non-Medicaid members. Only those individuals with at least one outpatient visit (medical or mental health respectively) during the study year were included in either analysis. Since the health services utilization data were not normally distributed, we used a logarithmic transformation of the volume of medical health services. This procedure helped alleviate the skewness in the data and is an approach widely used in the analysis of general medical care and specialty mental health services use.[51-52] Independent variables were entered by category: sociodemographics first (age and gender, and Medicaid status), followed by mood disorder status.

All multivariate statistics included only latent-age and adolescents because the rate of mood disorders in preschoolers was very low, and almost none received psychotropic medication.

RESULTS

Treated Prevalence and Incidence of Mood Disorders

Tables 2 and 3 show the treated prevalence and incidence of child and adolescent mood disorders in this population. A total of 1,823 youths with a mood disorder diagnosis were identified, representing 1.0% of latency age (6-11) and 4.2% of adolescents (12-17 years of age) enrolled in the medical plan during the study time frame. As a proportion of enrolled youths with healthcare visits during the study time frame, 1.4% of latent age (6-11 years of age) and 5.6% of adolescents (12-17 years of age) were identified with a mood disorders. Incident episodes accounted for 1,010 of the 1,823 mood disorders diagnosed (55.4%). The majority of those with incident mood disorders were given a diagnosis of depression not otherwise specified (n = 578; 57.2%), with far fewer cases diagnosed of major depression (n = 83; 8.2%), dysthymia (n = 106; 10.5%), or adjustment disorder with depressed mood (n = 243; 24.1%). Preschool children (3-5 years of age) were very infrequently diagnosed with mood disorders in the present study (0.1% of both the enrolled members and members with healthcare visits during the study time frame), and when diagnosed were given one of the less specific / severe types of depressive diagnosis (i.e., depression not otherwise specified or adjustment disorder with depressed mood).

Figure 1 shows treatment incidence of mood disorder by gender and age, demonstrating that between 12 and 14 years of age the incidence of mood disorders increases substantially for females with minimal increase among males of this age. We examined whether this finding was associated with a greater number of health care visits by female adolescents than male adolescents and, hence, with more opportunity for

Table 2 - Treatment Prevalence of Mood Disorders among Youth

	AGES					
	3 – 5		6 – 11		12 – 17	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
FREQUENCIES						
Major Depression	0	0	6	7	41	77
Dysthymia	0	0	25	14	65	104
Adj Dx w/Depressed Mood	4	2	64	63	89	210
Depression NOS	5	1	85	60	315	585
TOTALS	9	3	180	144	510	976
OVERALL PREVALENCE *(% of all members)*						
Major Depression	0.00	0.00	0.04	0.06	0.31	0.44
Dysthymia	0.00	0.00	0.15	0.09	0.44	0.60
Adj Dx w/Depressed Mood	0.06	0.03	0.39	0.40	0.54	1.21
Depression NOS	0.07	0.01	0.52	0.38	1.49	3.37
TOTALS	0.13	0.04	1.11	0.91	2.93	5.62
TREATED PREVALENCE *(% of all members with health care visits)*						
Major Depression	0.00	0.00	0.05	0.06	0.44	0.57
Dysthymia	0.00	0.00	0.22	0.13	0.62	0.76
Adj Dx w/Depressed Mood	0.07	0.04	0.56	0.57	0.76	1.54
Depression NOS	0.09	0.02	0.74	0.54	2.10	4.30
TOTALS	0.17	0.06	1.56	1.30	4.13	7.17

Table 3 - Treatment Incidence of Mood Disorders among Youth

	AGES					
	3 – 5		6 – 11		12 – 17	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
FREQUENCIES						
Major Depression	0	0	4	6	19	54
Dysthymia	0	0	10	7	39	50
Adj Dx w/Depressed Mood	4	2	32	42	45	118
Depression NOS	3	0	45	37	153	339
TOTALS	7	2	91	92	256	561
OVERALL INCIDENCE *(% of all members)*						
Major Depression	0.00	0.00	0.02	0.04	0.10	0.31
Dysthymia	0.00	0.00	0.06	0.04	0.22	0.29
Adj Dx w/Depressed Mood	0.06	0.03	0.20	0.27	0.25	0.68
Depression NOS	0.04	0.00	0.28	0.23	0.84	1.95
TOTALS	0.10	0.03	0.56	0.58	1.41	3.23
TREATED INCIDENCE *(% of all members with health care visits)*						
Major Depression	0.00	0.00	0.03	0.05	0.15	0.40
Dysthymia	0.00	0.00	0.09	0.06	0.30	0.37
Adj Dx w/Depressed Mood	0.07	0.04	0.28	0.38	0.35	0.87
Depression NOS	0.06	0.00	0.39	0.33	1.19	2.49
TOTALS	0.13	0.04	0.79	0.83	1.99	4.12

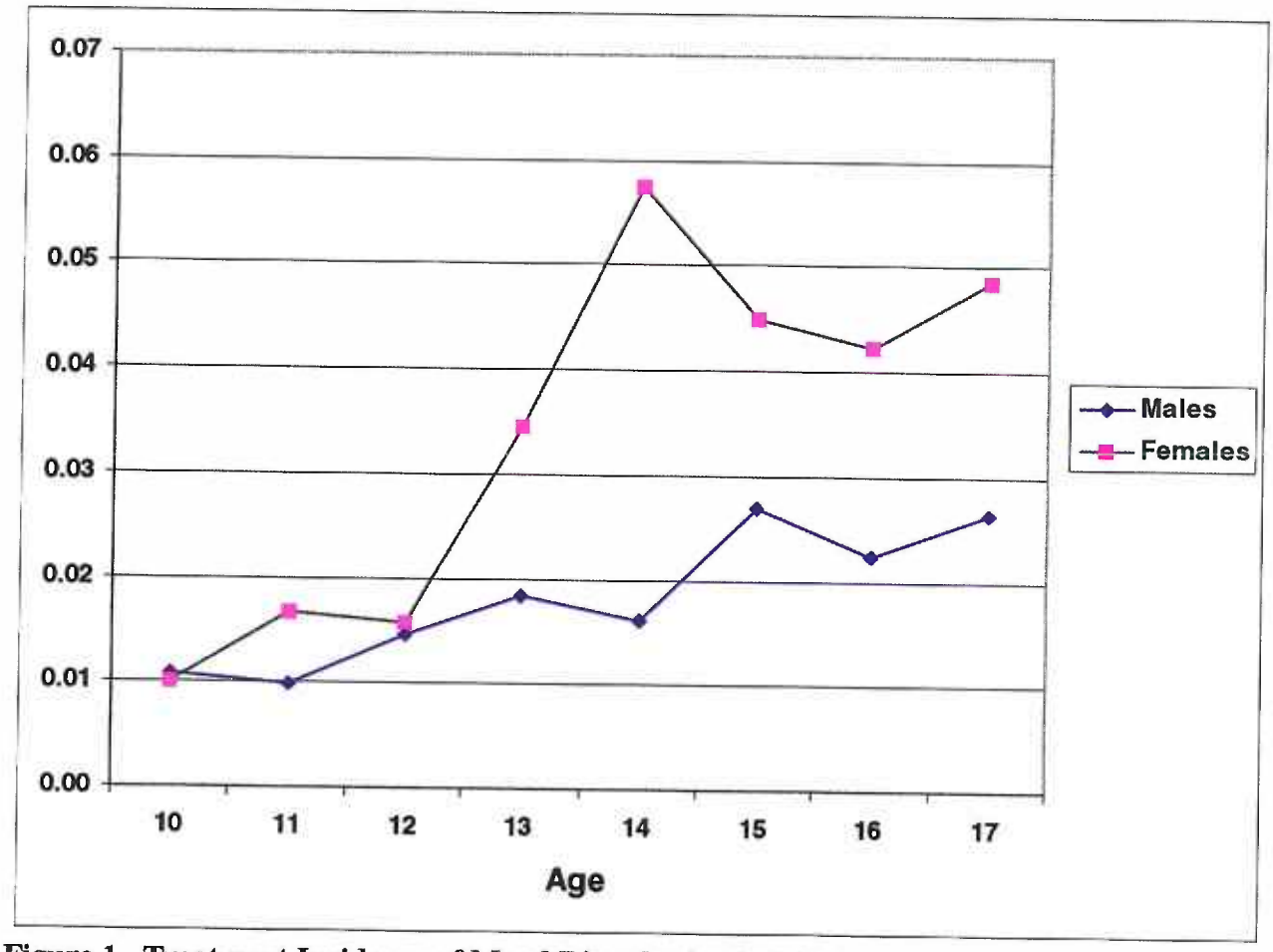

Figure 1. Treatment Incidence of Mood Disorder by Gender

providers to detect a mood disorder. Table 4 shows both the percentage of males and females of these ages enrolled in the health plan who were seen by a medical provider over the course of the study year as well as the mean number of visits among those with at least one health care visit over 1998. Interestingly, there are no significant differences in the percentage of males and females with at least one health care visit or primary care visit until 14 years of age, well after the dramatic increase in detected cases of mood disorders among females. For those individuals who have at least one health care visit during the study year, however, females make significantly more visits than do their male counterparts beginning at 13 years of age.

Medical settings identifying and providing services for youth with mood disorders. Of the 1,010 youth with "incident" mood disorders in 1998, 37.7% were initially identified in primary medical care, 5.4% in specialty medical care settings, and 56.9% in specialty mental health. Youth first seen in primary or specialty medical care were much more likely to be given a diagnosis of depression not otherwise specified (62.0%) than were youth identified through specialty mental health (27.2%) (χ^2=107.9, p<.001). Of these youth with "incident" episodes of diagnosed mood disorders, 121 (11.9%) received a shift of diagnosis to a more severe mood disorder during the 1998 study window. When this type of shift in mood disorder diagnosis occurred, a specialty mental health provider always gave the new diagnosis.

Of those non-Medicaid youth first seen for their mood disorder in a medical care setting (n=382), 43.5% (n=166) were seen by a provider in specialty mental health within the study year. Of the 216 (56.5%) non-Medicaid youth with diagnosed mood disorders who did not see a mental health care provider, 125 (57.9%) filled a prescription for a

Table 4 - Healthcare Visits during 1998 by Gender

Age	Visit type[1]	Percentage with healthcare visit(s)			Average number of healthcare visits[2]		
		Male	Female	X^2	Male	Female	T
10	Primary care	62.68	61.27	1.13	1.99 (1.70)	2.05 (1.87)	1.13
	Mental health	4.38	2.85	8.90**	0.25 (1.28)	0.14 (0.85)	3.14**
	Overall	71.33	71.11	0.03	3.27 (2.96)	3.33 (3.08)	0.65
11	Primary Care	63.25	63.04	0.03	2.03 (1.73)	2.01 (1.87)	0.25
	Mental Health	4.94	3.49	6.99**	0.25 (1.40)	0.17 (1.03)	2.03*
	Overall	71.62	72.01	0.10	3.47 (4.16)	3.34 (3.07)	1.10
12	Primary care	65.28	64.16	0.79	2.02 (1.79)	2.11 (1.89)	1.63
	Mental health	5.14	4.31	2.22	0.28 (1.56)	0.23 (1.38)	1.14
	Overall	73.62	73.16	0.15	3.49 (3.43)	3.62 (3.51)	1.23
13	Primary Care	65.85	67.81	2.43	1.99 (1.61)	2.19 (1.98)	3.76***
	Mental Health	5.26	5.90	1.07	0.29 (1.71)	0.38 (2.02)	1.58
	Overall	74.30	76.53	3.74	3.48 (3.45)	3.97 (4.12)	4.17***
14	Primary care	64.30	69.78	20.15***	1.95 (1.69)	2.26 (2.05)	5.50***
	Mental health	7.43	9.72	9.98**	0.43 (1.97)	0.55 (2.12)	1.95
	Overall	73.89	79.02	21.69***	3.71 (3.65)	4.30 (4.25)	5.02***
15	Primary Care	58.49	69.49	78.91***	1.80 (1.66)	2.40 (2.32)	10.11***
	Mental Health	8.39	9.41	1.96	0.52 (2.24)	0.58 (2.76)	0.86
	Overall	70.07	79.68	73.65***	3.62 (3.72)	4.91 (5.49)	9.30***
16	Primary care	57.33	69.50	99.85***	1.87 (1.74)	2.40 (2.12)	9.35***
	Mental health	8.99	8.33	0.87	0.58 (2.42)	0.40 (1.81)	2.84**
	Overall	68.25	80.02	112.65***	3.78 (4.03)	4.95 (4.67)	9.16***
17	Primary Care	53.66	69.63	158.85***	1.71 (1.75)	2.39 (2.26)	11.29***
	Mental Health	7.26	8.15	1.64	0.48 (2.65)	0.40 (2.35)	1.12
	Overall	65.99	81.68	187.22***	3.48 (4.01)	5.35 (5.30)	13.24***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

[1]"Overall" also includes specialty medical care visits

[2]Only among those with at least one healthcare visit during 1998; standard deviations in parentheses

psychotropic medication within 30 days of their incident mood disorder diagnosis.

Pharmacotherapy for Youth Mood Disorders

Of the 1,010 cases with an incident mood disorder, a total of 392 (38.8%) were dispensed a psychotropic medication within the first 30 days following the diagnosis of their mood disorder. Of these youth, 326 (83.2%) received an SSRI, 17 (4.3%) received a TCA, 33 (8.4%) received another antidepressant (i.e., bupropion, nefazodone, trazodone, or venlafaxine), 8 (2.0%) received a benzodiazepine, and 8 (2.0%) received a mood stabilizer. Thus, the majority of these prescriptions were for a SSRI, with substantially fewer TCAs or other types of psychotropic medications dispensed. Table 5 presents rates for dispensings of these psychotropic medications by age group and sex.

To determine whether patient or treatment characteristics were associated with receiving a psychotropic medication, a logistic regression model was specified. Table 6 presents the results from this model. After controlling for the effects of sex and Medicaid status, older youth were more likely to receive psychotropic medication (O.R. 1.21, 95% C.I., 1.15 - 1.26), as were those who received their mood diagnosis within a medical care setting rather than a specialty mental health setting (O.R. 4.16, C.I., 3.23 - 5.35) and those with diagnosis of major depression in comparison with those with a diagnosis of depression not otherwise specified (O.R. 2.47, 95% C.I., 1.64 - 3.72). Youth with an initial mood disorder diagnosis of adjustment disorder with depressed mood were less likely to receive psychotropic medication than were their counterparts with diagnoses of depression not otherwise specified (O.R. 0.26, C.I., 0.18 - 0.38).

Health Care Utilization by Youth with Clinically Identified Mood Disorders. Table 7 shows the mean number (and variance) of visits made by both youth identified

Table 5 - Children and Adolescents Receiving Psychiatric Medication Within 30 Days of Incident Mood Disorder Diagnosis

	Department of First Diagnosis																	
	Mental Health								Primary Care									
	Age on 1/1/98								Age on 1/1/98									
	3 - 5		6 - 11		12 – 17		All		3 – 5		6 - 11		12 - 17		All		Grand Total[1]	
	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N
Females																		
Medication Dispense																		
No	100.0	2	89.6	60	69.6	208	73.4	270	N/A	0	54.5	12	38.1	86	39.5	98	58.5	383
Yes	0.0	0	10.4	7	30.4	91	26.6	98	N/A	0	45.5	10	61.9	140	60.5	150	41.5	272
Males																		
Medication Dispense																		
No	100.0	4	90.9	50	90.9	115	81.6	169	66.7	2	78.8	26	34.4	33	46.6	62	66.2	235
Yes	0.0	0	9.1	5	9.1	33	18.4	38	33.3	1	21.2	7	65.6	63	53.4	71	33.8	120

[1]Includes 114 children and adolescents for whom a specialty medical clinic (e.g., obstetrics/gynecology, gastroenterology, pediatric oncology, and pediatric neurology) was the department in which the first mood disorder diagnosis was given

Table 6 – Predictors of Psychotropic Medication Dispenses for Youth Mood Disorders

Predictors	Exp (β)	95% Confidence Interval
Sex		
Female (vs. male)	1.15	0.91 - 1.43
Age		
Years	**1.21**	**1.15 – 1.26**
Medicaid Status		
Some (vs. none)	1.23	0.80 – 1.90
Department of First Mood Diagnosis		
Medical (vs. mental health)	**4.16**	**3.23 – 5.35**
Mood Diagnosis (vs. Depression NOS)		
Major Depression	**2.47**	**1.65 – 3.72**
Dysthymia	1.01	0.70 – 1.46
Adjustment Disorder w/Depressed Mood	**0.26**	**0.18 – 0.38**

Table 7 – Mean Number and Standard Deviation of Health Care Visits by Youth with at Least One Health Care Visit during the Study Time Frame

	Age on 1/1/98								
	3 - 5			6 - 11			12 - 17		
	Depressed	Nondepressed	T	Depressed	Nondepressed	T	Depressed	Nondepressed	T
Primary Medical Care Visits[1]	3.55 (2.94)	3.92 (3.37)	0.42	3.35 (2.37)	2.36 (1.78)	7.02***	3.94 (3.10)	2.33 (1.74)	19.02***
Overall Medical Care Visits[2]	4.00 (3.07)	4.59 (4.23)	0.64	4.64 (3.64)	3.13 (2.94)	7.12***	5.99 (5.26)	3.57 (3.38)	17.22***
Mental Health Specialty Care Visits[3]	1.83 (0.98)	2.70 (2.71)	1.94	4.74 (4.21)	3.26 (3.10)	5.18***	5.48 (6.40)	3.49 (4.24)	9.01***
Overall Health Care Visits[4]	4.23 (3.09)	4.61 (4.24)	0.45	7.86 (5.23)	3.24 (3.07)	15.94***	9.71 (8.06)	3.74 (3.65)	28.67***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

[1]Analyses only include subjects with at least one primary medical care visit

[2]Analyses only include subjects with at least one overall medical care visit

[3]Analyses only include subjects with at least one mental health specialty care visit

[4]Analyses only include subjects with at least one overall health care visit

with mood disorders as well as youth not identified with mood disorders but with at least one health care visit during the study time frame. Descriptive data is presented for both medical and mental health specialty care. Only nonMedicaid subjects are included in the calculations for mental health specialty care as Medicaid members receive these services outside KPNW. In both latent-age and adolescent groups, those with identified mood disorders utilize significantly higher health care services in each sector than do their counterparts without identified mood disorders. A linear regression model was constructed to examine the contribution of a mood disorder diagnosis to amount of both medical health care and mental health care utilization. The results of the model building are displayed in Table 8. Only youth who made at least one medical health care visit during the study year were included in the first analysis. In this population, mood disorder diagnostic status was associated with utilization of medical care after controlling for the effects of sex, age, and Medicaid status. Thus, the presence of a mood disorder was a significant predictor of the amount of medical care utilized over the study year. The overall amount of medical care utilization variance accounted for, however, was minimal (3%). Similar results were obtained when predicting amount of mental health specialty care utilization. Only nonMedicaid subjects who had at least one specialty mental health care visit during the study window were included in this analysis. Mood disorder diagnostic status was associated with utilization of medical care after controlling for the effects of sex and age. The amount of specialty mental health care utilization variance accounted was small (6%) but somewhat more than that found in the previous analysis.

Table 8. Estimated Regression Coefficients for Predicting the Effects of Identified Mood Disorders in Youth on Log Health Care Utilization Rates Controlling for Demographic Factors

Predictor	β	Partial F	P Value
Overall Medical Care Utilization			
Demographics			
Sex	0.07	241.78	0.0001
Age	0.07	273.10	0.0001
Medicaid Status	0.04	92.37	0.0001
Mood Disorder Status	0.12	673.81	0.0001
	$R^2 = 0.03$	F = 354.09	0.0001
Specialty Mental Health Care Utilization[1]			
Demographics			
Sex	-0.03	3.91	0.05
Age	-0.02	0.76	0.38
Mood Disorder Status	0.25	215.69	0.0001
	$R^2 = 0.06$	F = 73.16	0.0001

[1]Analysis only includes nonMedicaid subjects

DISCUSSION

Context of Findings

Study results in several domains - including prevalence and incidence rates, diagnostic findings, and pharmacotherapy – deserve further comment and are discussed in turn below.

Prevalence and Incidence. As already noted, although the general prevalence pattern was similar to those reported in community epidemiology studies,[53] the overall rates were somewhat lower. These figures are consistent with epidemiology research that indicates only a minority of community-residing depressed youth obtains any professional treatment.[54] In addition, the comparison to reported prevalence rates in community epidemiology studies is inexact, as only infrequently are community prevalence rates reported over a one-year window. More often these findings have been reported as point prevalences or lifetime prevalence and, thus, are not directly comparable to rates found in this study.

Also congruent with reports from community epidemiology projects, this study found that between 12 and 14 years of age the incidence of mood disorders increased substantially for females with a minimal increase among males. Although this suggests that the gender differences seen in this study likely corresponded to real differences in diagnosable mood disorders between males and females, we further examined whether this finding was associated with a greater number of health care visits by female adolescents than male adolescents and, hence, with more opportunity for providers to detect a mood disorder. Interestingly, we found no significant differences in the percentage of males and females with at least one health care visit until 14 years of age,

well after the dramatic increase in detected cases of mood disorders among females. For those individuals who have at least one health care visit during the study year, however, females made significantly more visits than did their male counterparts beginning at approximately 13 years of age. Hence, there may be additional opportunity to detect mood disorders in girls due to their more frequent health care visits.

Importantly, this study found that a significant proportion of youth with mood disorders were being identified and treated within primary or specialty medical care settings. Of the 43% of the youth initially identified with mood disorders within medical settings, more than half of those eligible to receive services in specialty mental health (i.e., those youth who were not Medicaid recipients) were not also seen within the health plan's specialty mental health clinics within the study year (56.2%). The substantial amount of treatment for mood disorders which appears to be occurring within primary care settings is not unexpected given the structure of this health care system. Within this system, similar to other HMO's, primary care providers are the coordinators of service and provide a range of services when appropriate, including mental health-related treatment. Thus, it is likely that only those with more serious or difficult-to-treat mood disorders are referred by their primary care provider (or self-refer) to mental health specialty care. However, the proportion of youth who are initially identified with mood disorders by their medical providers but whom subsequently receive mental health services (43%) is likely an underestimate of the number of youth actually referred to a mental health specialist by their primary care provider. Anecdotal reports indicate that some members elect not to follow-up on mental health referrals even when recommended by their primary care providers. Some members may also elect to seek mental health care

through providers outside the health care system (e.g., other non-HMO providers, school counselors, etc.). In addition, mental health treatment is not a covered benefit within the healthcare system for Medicaid recipients; Oregon state laws mandate that such services be provided for Medicaid members by contracted community mental health agencies in the region. Thus, most mental health services utilized by individuals with Medicaid necessarily are outside the health plan. Overall, however, study findings suggest that a sizable group of youth is being both identified and treated for mood disorders exclusively within the HMO's medical care settings, particularly primary care. This pattern of treatment within primary care is consistent with that seen among adult members of the health plan.[38]

Diagnostic Findings. In addition to the large number of youth identified in a medical rather than mental health setting, youth first seen in primary or specialty medical care were much more likely to be given a diagnosis of depression not otherwise specified than were youth identified through specialty mental health. Although medical practitioners gave diagnoses of depression not otherwise specified most frequently (90.2%), the rates were also reasonably high among mental health providers within the health plan (27.2%). There are a number of likely reasons for the frequency of this diagnosis. First, the high rates of depression not otherwise specified among medical providers may, in part, be an artifact of the electronic medical record system, which lists this diagnosis as the principal, default depression diagnosis.[55] However, the use of this diagnosis has also been found to be much higher than expected among behavioral health care practitioners in the health plan, despite the inclusion of multiple mood disorder diagnosis options.[56] Second, the use of depression not otherwise specified also likely

represents the providers' uncertainty regarding the patient's specific fit with the diagnostic criteria for major depression or dysthymia, particularly as the diagnosis is often based on a relatively brief visit. We suspect that a large proportion of these depressed youth would have met criteria for either major depression and/or dysthymia, had they been interviewed with structured psychiatric interviews. In fact, youth with depression identified and treated in clinical settings have been found to be phenomenologically very similar to depressed youth identified in community surveys.[12] Finally, even in the event that youth diagnosed with depression not otherwise specified were less impaired than youth with major depressive disorder or dysthymia, providing pharmacotherapy or other mental health treatment to such youth may be indicated. A recent report suggests that specialty mental health service systems appear to be more responsive to impairment than diagnosis.[55] In addition, youth with subclinical mood disorders were found to be as disturbed as many youth meeting full clinical criteria for a major mood disorder diagnosis. These authors suggest that youth with subclinical mood disorders should be regarded as suffering from a psychiatric disorder.

Pharmacotherapy. Several factors limit comparison of the findings reported here with the results of previous investigations. First, many of the previous studies report on treatment-seeking in a sample of depressed youth identified for research purposes, and not necessarily already in contact with a treatment provider.[30-31] In this study, depressed youth had already made at least one visit to a primary care provider for a health problem. This difference in the sampling frame may help explain why other studies found such low rates of pharmacotherapy.[30-31]

Second, other studies were based on prescriber surveys of antidepressant and

other medication use with children with all types of mental health disorders. Some studies were limited to child psychiatrists[32-34] while others queried both mental health and primary care physicians.[35] In contrast, our report includes both medical and mental health providers but is limited specifically to cases with a recorded mood disorder diagnosis. Further, our report is based on an electronic medical record search for actual case-based prescriptions, rather than retrospective provider surveys. The greater specificity of this report, and the different data sources, makes it difficult to compare with these previous investigations.

Finally, there have been significant changes in medication use in very recent years. The high use of SSRIs in this sample parallels recent overall shifts in prescribing practices in health care, which has generally adopted SSRIs as a first-line medication of choice for adults.[57] Beyond general prescribing trends, the potentially serious side effects of tricyclics, including sudden cardiac death,[58] compared to the relatively safer side effect profile of SSRIs and their lower overdose toxicity[59] probably contribute to an even greater adoption of these medications in the treatment of depressed youth.

The high rates of pharmacotherapy in primary care for youth with mood disorders is not unexpected. The capacity to deliver alternatives to pharmacotherapy, especially psychotherapy, are limited in primary care. The elevated rates of medication treatment in primary care in this sample may also be a function of who gets treated in primary care and who is referred on to specialty mental health for diagnosis and treatment. Anecdotal information, as well as information from a study of depressed adults in this HMO,[38] indicate that the more evident and uncomplicated cases of depression are treated in primary care, while the more complicated cases (e.g., with greater comorbidity or those

seen as needing psychotherapy) are more likely to be referred to specialty mental health. Medication may be a more frequent and perhaps more appropriate treatment choice for these uncomplicated cases.

While the use of antidepressants was less frequent among younger children in this sample, this age difference may ultimately disappear. For example, in a controlled trial of fluoxetine with youth from ages 8 to 18, medication appeared to work as well for younger children as it did with older adolescents.[27] If these results are replicated by others, and with other medications, we may see greater medication treatment of childhood depression in the future. However, until these results are replicated, pharmacotherapy for younger, depressed children should be approached with caution.

Study Limitations and Strengths

We should note that the conclusions drawn from this study are limited in several ways. First, although representing a large regional health care system, our information is limited to a single and specific type of HMO (non-profit group model). To confidently generalize our findings, further work is needed in other geographic regions and with other types of health care delivery systems to determine whether similar patterns emerge more generally. As previously noted, Medicaid patients receive their mental health services through state contracted community mental health agencies. Hence, some of the information presented was limited to nonMedicaid patients.

Another limitation of the present study was the cross-sectional nature of the data collected. This resulted in at least two limitations in interpretation. First, when describing utilization of medical and mental health services by those with identified mood disorders, the utilization was that occurring over the course of the study year

without the ability to differentiate between utilization of services before and after a mood disorder was identified. Thus, the significantly greater medical and mental health care utilization among mood disordered youth may have merely been that associated with treatment of their mood disorder rather than a meaningful increase in health care utilization among this group. Future investigations should differentiate utilization prior to and following a mood disorder diagnosis, identify visits related and unrelated to the mood disorder diagnosis, as well as include other control groups (e.g., those with medical illnesses and those with other psychiatric conditions) to better determine the implications of greater medical and mental health care utilization among youth with identified mood disorders. A second limitation arising from the cross-sectional nature of the data collected was the inexact link between prescribing provider and medication dispenses. For this study, information regarding psychotropic medications was gathered from the pharmacy dispensing database. Although linkages in time were made to the identification of a mood disorder (within 30 days), the incident provider may not have always been the prescribing provider.

Finally, in the current study we were only able to examine pharmacotherapy for mood disorders, rather than evaluating a wider array of treatments. Our HMO data system does not currently permit the accurate identification of referral for psychotherapy services for these depressed youth, which is the other major treatment modality for this disorder.[11-12,60] While our electronic medical systems record referrals and visits to mental health specialists, without follow-up interviews of providers and/or members we cannot determine the nature of these visits. Future expansion of the electronic data system to include more detailed information regarding psychosocial services and referral to mental

health providers may permit comparison of medication and psychotherapy services for depressed youth.

Despite these study limitations; the present study has several important strengths. The study examined "treatment" epidemiology in a regional division of one of the country's largest HMOs. Because most Americans covered by health insurance at the present time receive their healthcare through managed care (approximately 75%), it is very important to understand the pattern of care within this sector. We were also able to evaluate the role of both medical and mental health services in identifying and treating youth with mood disorders, because non-Medicaid patients enrolled in the health care plan have mental health services included in their health coverage. Thus, financial or pragmatic barriers to accessing specialty mental health services were not generally factors in the current study. A third strength of this study was our ability to use electronic medical record databases for the data collection. Most past studies have had to rely on either retrospective parent and/or youth self-report or retrospective provider surveys to determine patterns of identification and treatment. These approaches have inherent limitations. Finally, this study provided an unprecedented opportunity to describe current practices in pediatric, family practice, and specialty mental health care settings. It is increasingly important that we understand clinical practices in real-world settings. Although evaluating the efficacy of particular treatments for youth mood disorders through randomized trials is a necessary first step, a broader understanding of current usual care practices (including the practices of diverse practitioners operating under real-world constraints) is imperative in bridging the gap between our level of scientific understanding and practices implemented in real world clinical settings.

Policy Implications and Future Directions

While it is reassuring that youth with mood disorders generally appear to be receiving appropriate forms of pharmacotherapy, we cannot conclude from this study that youth are being medicated at an appropriate dose or for an adequate duration. Nor is it clear whether these children and adolescent are receiving other forms of treatment (e.g., psychotherapy and other social services) when indicated. More research is warranted to determine the types and characteristics of services that most benefit youth with mood disorders in general medical as well as specialty mental health care. A more thorough examination of the full range of mood disorders and their responsiveness to differential forms or combinations of treatment (including the role of co-morbidities, broader family problems, etc) is another important direction for future research.

This study parallels findings in adult populations that suggest that most individuals with mood disorders are treated in primary care.[39-41] Yet, apart from pharmacotherapy, it is unclear what types of care are actually being provided in these primary care settings. Future studies need to examine the different types of services delivered to youth with mood disorders, including services provided by educational and other non-medical systems. Additional studies should evaluate whether systematic attempts by health care systems to improve the quality of services delivered in primary care to youth with mood disorders (for example, special training in diagnosis and treatment of mood disorders for primary care providers) may improve outcomes and reduce overall health care utilization for these youth.

The organizational and financial incentives in different types of managed care organizations differ considerably, and recent research has indicated that not-for-profit

managed care systems may have better quality care than for-profit systems.[61] Future research should pay more attention to the setting of care and carefully examine methods of providing systematic care for mood disorders in a variety of settings. Differences in systems of care may drive differences in use. The use of guidelines, protocols, or non-traditional approaches such as telephone medication check-ups needs to be evaluated.

We are only beginning to understand the types and extent of services used by children with mood disorders. Most research to date provides little information about the quality and appropriateness of care received by these youth or the outcomes of the treatment. As we move towards continued refinement in the monitoring of the quality and appropriateness of care, we need to use methods that are consistent with the reality of clinical practice. For example, clinical diagnoses are typically not as precise as research level diagnoses of psychiatric conditions, but these are the markers for identifying disorder in clinical settings.

Finally, we need to better understand how different service delivery systems influence access, use, and appropriateness of services used by youth with mood disorders. Research on care in routine clinical settings can help to identify key service delivery features in order to pinpoint opportunities for new interventions to improve the care for youth with mood disorders.

SUMMARY AND CONCLUSIONS

This study examined the "treated" prevalence, incidence, and pharmacotherapy of child and adolescent mood disorders in a managed care setting. General prevalence patterns across age and sex were similar to those reported in community epidemiology studies, although not unexpectedly, the overall rates were somewhat lower. In addition to identification within specialty mental health care, primary care providers identified a substantial proportion of the youth with a mood disorder. Furthermore, antidepressant medication was more often used by youth identified in primary and specialty medical care settings than by those youth identified with a mood disorder in specialty mental health care settings. These study results also suggest that youth with mood disorders receiving medication prescriptions across settings appear to be treated according to current best practice guidelines, that is, primarily with SSRI medications. To our knowledge, this is the first published report of rates of pharmacotherapy for mood disorders in children and adolescents within a treatment setting. These data are important because they provide a benchmark for comparison of service patterns across types of clinical care settings (e.g., fee-for-service, managed care, and public mental health). Finally, this study provides some preliminary data suggesting that youth with mood disorders may have higher utilization of general and specialty medical services than their counterparts without mood disorders and higher utilization of specialty mental health services than youth using such services for other difficulties.

REFERENCES

1. Birmaher, B., Ryan, N. D., Williamson, D.E., Brent, D.A., Kaufman, J., Dahl, R.E., Perel, J., & Nelson, B. (1996a). Childhood and adolescent depression: A review of the past 10 years. Part I. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 1427-1439.

2. Ryan, N. D., Williamson, D. E., Iyengar, S., Orvaschel, H., Reich, T., Dahl, R. E., & Puig-Antich, J. (1992). A secular increase in child and adolescent onset affective disorder. Journal of the American Academy of Child and Adolescent Psychiatry, 31, 600-605.

3. Lewinsohn, P.M., Hops, H., Roberts, R.E., Seeley, J.R., & Andrews, J.A. (1993). Adolescent psychopathology, I: prevalence and incidence of depression and other DSM-III-R disorders in high school students. Journal of Abnormal Psychology, 102, 133-144.

4. Lewinsohn, P.M., Rohde, P. & Seeley, J.R. (1998a). Treatment of adolescent depression: Frequency of services and impact on functioning in young adulthood. Depression and Anxiety, 7, 47-52.

5. Anderson, J.C., & McGee, R. (1994). Comorbidity of depression in children and adolescents. In W.M. Reynolds and H.F. Johnson (Eds.), Handbook of Depression in Children an Adolescents. New York: Plenum, pp 581-601.

6. Cohen, P., Cohen, J., Kasen, S., et al. (1993). An epidemiological study of disorders in late childhood and adolescence, I: age- and gender-specific prevalence. Journal of Child Psychology and Psychiatry, 34, 851-866.

7. Fleming, J. E., Offord, D. R., and Boyle, M. H. (1989). Prevalence of childhood and adolescent depression in the community: Ontario Child Health Study. British Journal of Psychiatry, 155, 647-654.

8. Fleming, J.E. & Offord, D.R. (1990). Epidemiology of childhood depressive disorders: a critical review. Journal of the American Academy of Child and Adolescent Psychiatry, 29, 571-580.

9. Kashani, J.H., Beck, N.C., Hoeper, E.W. et al. (1987a). Psychiatric disorders in a community sample of adolescents. American Journal of Psychiatry, 144, 584-589.

10. Kashani, J.H., Carlson, G.A., Beck, N.C. et al. (1987b). Depression, depressive symptoms, and depressed mood among a community sample of adolescents. American Journal of Psychiatry, 144, 931-934.

11. Birmaher, B., Ryan, N.D., Williamson, D.E., Brent, D.A. & Kaufman, J. (1996b). Childhood and adolescent depression: a review of the past 10 years. Part II. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 1575-1583.

12. Lewinsohn, P.M., Rohde, P., & Seeley, J.R. (1998b). Major depressive disorder in older adolescents: Prevalence, risk factors, and clinical implications. Clinical Psychology Review, 18, 765-794.

13. Costello, E.J., Angold, A., Burns, B.J., Erkanli, A., Stangl, D.K., & Tweed, D.L. (1996a). The Great Smoky Mountains study of youth: Functional impairment and severe emotional disturbance. Archives of General Psychiatry, 53, 1137-1143.

14. Costello, E.J., Angold, A., Burns, B.J., Stangl., D.K., Tweed, D.L., Erkanli, A., & Worthman, C.M. (1996b). The Great Smoky Mountains study of youth: Goals, design, methods, and the prevalence of DSM-III-R disorders. Archives of General Psychiatry, 53, 1129-1136.

15. Farmer, M.Z., Stangl, D.K., Burns, B.J., Costello, E.J., Angold, A. (1999). Use, persistence, and intensity: Patterns of care for children's mental health across one year. Community Mental Health Journal, 35, 31-46.

16. Verhulst, F.C., & Van Der Ende, J. (1997). Factors associated with child mental health service use in the community. Journal of the American Academy of Child and Adolescent Psychiatry, 36, 901-909.

17. Lavigne, J. V., Arend, R., Rosenbaum, D., Binns, H. J., Christoffel, K. K., Burns, A., and Smith, A. (1998). Mental health service use among young children receiving pediatric primary care. Journal of the American Academy of Child and Adolescent Psychiatry, 37, 1175-1182.

18. Lavigne, J. V., Gibbons, R. D., Khristoffel, K. K. et al. (1996). Prevalence rates and risk factors for psychiatric disorders among preschool children. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 204-214.

19. Wu, P., Hoven, C. W., Bird, H. R., Moore, R. E., Cohen, P., Alegria, M., Dulcan, M. KJ., Goodman, S. H., Horwitz, S. M., Lichtman, J. H., Narrow, W. E., Rae, D. S., Regier, D. A., & Roper, M. T. (1999). Depressive and disruptive disorders and mental health service utilization in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 1081-1092.

20. Jensen, P.S., Bhatara, V. S., Vitiello, B., Hoagwood, K., Feil, M., & Burke, L.B. (1999). Psychoactive medication prescribing practices for U.S. children: Gaps between research and clinical practice. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 557-565.

21. Vitiello, B., Bhatara, V.S., & Jensen, P.S. (1999). Introduction: Current knowledge and unmet needs in pediatric psychopharmacology. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 501-502.

22. Conners, K. (1992). Methodology of antidepressant drug trials for treating depression in adolescents. Journal of Child and Adolescent Psychopharmacology, 2, 11-

23. Hazell, P., O'Connell, D., Heathcote, D., Robertson, J. & Henry, D. (1995). Efficacy of tricyclic drugs in treating child and adolescent depression: A meta-analysis. British Medical Journal, 310, 897-901.

24. Jensen, P.S., Ryan, N.D. & Prien, R. (1992). Psychopharmacology of child and adolescent major depression: Present status and future directions. Journal of Child and Adolescent Psychopharmacology, 2, 31-45.

25. Emslie, G. J., Walkup, J. T., Pliszka, S. R., Ernst, M. (1999). Nontricyclic antidepressants: Current trends in children and adolescents. Journal of the American Academy of Child and Adolescenty Psychiatry, 38, 517-528.

26. Geller, B., Reising, D., Leonard, H.L., Riddle, M.A., & Walsh, B.T. (1999). Critical review of tricyclic antidepressant use in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 513-536.

27. Emslie, G., Rush, J.A., Weinberg, W.A., Kowatch, R., Huges, C.W., Carmody, T., Rintelmann, J. (1997). A double-blind randomized placebo-controlled trial of fluoxetine in children and adolescents with depression. Archives of General Psychiatry, 54, 1031-1037.

28. SmithKline-Beecham (1993). A multi-center, double-blind, placebo controlled study of paroxetine and imipramine in adolescents with unipolar major depression. Unpublished study protocol, SmithKline Beecham.

29. Ambrosini, P.J., Wagner, K.D., Biederman, J., Glick, I., Tan, C., Elia, J., Hebeler, J.R., Rabinovich, H., Lock, J., & Geller, D. (1999). Multicenter open-label sertraline study in adolescent outpatients with major depression. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 566-572.

30. Keller, M.B., Lavori, P.W., Beardslee, W.R., Wunder, J., & Ryan, N. (1991). Depression in children and adolescents: New data on 'undertreatment' and a literature review on the efficacy of available treatments. Journal of Affective Disorders, 21, 163-171.

31. Kovacs, M., Feinberg, T. L., Crouse-Novak, M. A., Paulauskas, S. L., & Finkelstein, R. (1984). Depressive disorders in childhood: I. A longitudinal prospective study of characteristics and recovery. Archives of General Psychiatry, 41, 229-237.

32. Kaplan, S.L., Simms, R.M. & Busner, J. (1994). Prescribing practices of outpatient child psychiatrists. Journal of the American Academy of Child and Adolescent Psychiatry, 33, 35-44.

33. Bramble, D.J. (1995). Antidepressant prescription by British child psychiatrists: Practice and safety issues. Journal of the American Academy of Child and Adolescent Psychiatry, 34, 327-331.

34. Bramble, D.J. & Dunkley, S.D. (1992). A survey of the use of antidepressants by British child psychiatrists. Psychiatric Bulletin, 16, 396-398.

35. Adams, S. (1991). Prescribing of psychotropic drugs to children and adolescents. British Medical Journal, 302, 26.

36. Safer, D.J. (1997). Changing patterns of psychotropic medications prescribed by child psychiatrists in the 1990s. Journal of Child and Adolescent Psychopharmacology, 7, 267-274.

37. Majeroni, B. A., & Hess, A. (1998). The pharmacologic treatment of depression. Journal of the American Board of Family Practice, 11, 127-139.

38. Shye, D., Freeborn, D.K., & Mullooly, J.P. (in press). Understanding depression care in the HMO outpatient setting: What predicts key events on the pathway to care? Research in Community Mental Health, 11.

39. Tylee, A. (1999). Depression in the community: physician and patient perspective. Journal of Clinical Psychiatry, 60 Suppl 7, 12-6.

40. Cassidy, L. J., & Jellinek, M.S. (1998). Approaches to recognition and management of childhood psychiatric disorders in pediatric primary care. Pediatric Clinics of North America, 45, 1037-1052.

41. Katon, W., & Schulberg, H. (1992). Epidemiology of depression in primary care. General Hospital Psychiatry, 14, 237-247.

42. Simon, G.E., VonKorff, M., Piccinelli, M., Fullerton, C., & Ormel, J. (1999). An international study of the relation between somatic symptoms and depression. New England Journal of Medicine, 341, 1329-1335.

43. Weiss, J., Freeborn, D.K., & Lamb, S. (1973). Use of mental health services by poverty and nonpoverty members of a prepaid group practice plan Health Services Reports, 88, 653-662.

44. Regier, D.A., Narrow, W.E., Rae, D.S., Manderscheid, R.W., Locke, B.Z. & Goodwin, F.K. (1993). The de facto US mental and addictive disorders service system: Epidemiologic catchment area prospective 1-year prevalence rates of disorders and services. Archives of General Psychiatry, 50, 85-94.

45. Shatin, D., Levin, R., Ireys, H.T., Haller, V. (1998). Health care utilization by children with chronic illnesses: a comparison of Medicaid and employer-insured managed care. Pediatrics, 102, E44.

46. Iglehart, J.K. (1996). Managed care and mental health. New England Journal of Medicine, 335, 56-58.

47. Stroul, B.A.,Pires, S.A., Armstrong, M.I., & Meyers, J.C. (1998). The impact of managed care on mental health services for children and their families. Future Child, 8, 119-133.

48. Szilagyi, P.G. (1998). Managed care for children: effect on access to care and utilization of health services. Future Child, 8, 39-59.

49. Freeborn, D.K., Pope, C.R. (1994). Promise & Performance in Managed Care: The Prepaid Group Practice Model. Baltimore: The Johns Hopkins University Press.

50. Levin, B.L. (1990). Mental health services within the HMO group. HMO Practice, 6, 16-21.

51. Manning, W.G., & Wells, K.B. (1992). The effects of psychological distress and psychological well-being on use of medical services. Medical Care, 30, 541-553.

52. Taube, C.A., Kessler, L.G., & Burns, B.J. (1986). Estimating the probability and level of ambulatory mental health services use. Health Services Research, 21 (2 Pt 2), 321-340.

53. Essau, C.A., & Dobson, K.S. (1999). Epidemiology of depressive disorders. In C.A. Essau and F. Petermann (Eds.), Depressive Disorders in Children and Adolescents. Northvale, New Jersey: Jason Aronson, Inc.

54. Lewinsohn, P.M., Rohde, P., Klein, D.N., & Seeley, J.R. (1999). Natural course of adolescent major depressive disorder: I. Continuity into young adulthood. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 56-63.

55. Kaiser Permanente (1999). Kaiser Permanente Depression Outcomes Report

56. Angold, A., Costello, E.J., Farmer, E.M.Z., Burns, B.J., Erkanli, A. (1999). Impaired but undiagnosed. Journal of the American Academy of Child and Adolescent Psychiatry, 38, 129-137.

57. Johnson, R.E., McFarland, B.M. & Nichols, G.A. (1997). Changing patterns of antidepressant use and costs in a health maintenance organization. Pharmacoeconomics, 11, 274-286.

58. Wilens, T.E., Biederman, J., Baldessarini, R.J., Geller, B., Schleifer, D., Spencer, T.J., Birmaher, B. & Goldblatt, A. (1996). Cardiovascular effects of therapeutic doses of tricyclic antidepressants in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry, 35, 1491-1501.

59. Gram, L.F. (1994). Fluoxetine. New England Journal of Medicine, 331, 1354-1361.

60. Lewinsohn, P.M., Clarke, G.N., & Rohde, P. (1994). Psychological approaches to the treatment of depression in adolescents. In W.M. Reynolds & H.F. Johnston (Eds.), Handbook of Depression in Children and Adolescents (pp. 309-344). NY: Plenum.

61. Himmelstein, D.U., Woolhandler, S., Hellander, I., Wolfe, S.M. (1999). Quality of care in investor-owned vs. not-for-profit HMOs. Journal of the American Medical Association, 282, 159-163.