Psychotherapeutic Medication Patterns for Youths With Attention-Deficit/Hyperactivity Disorder

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Objectives: (1) To describe temporal patterns of office visits for attention-deficit/hyperactivity disorder (ADHD) and stimulant treatment for 5- to 14-year-old US youths; (2) to compare youth visits for ADHD with and without medication according to patient demographics, physician specialty, reimbursement source, and comorbid diagnoses; and (3) to compare office visits for youths with ADHD in relation to common medication patterns (stimulants alone, stimulants with other psychotherapeutic medication, and nonstimulant psychotherapeutic medications alone).

Design: Survey based on a national probability sample of office-based physicians in the United States.

Setting: Physician offices.

Participants: A systematically sampled group of office-based physicians.

Main Outcome Measures: National estimates of office visits for ADHD and psychotherapeutic drug visits for ADHD for each year and for a combined 8-year period.

Results: Youth visits for ADHD as a percentage of total physician visits had a 90% increase, from 1.9% in 1989 to 3.6% in 1996. Stimulant therapy within ADHD youth visits rose from 62.6% in 1989 to 76.6% in 1996. While the majority of non-ADHD youth visits were conducted by primary care physicians, one third of ADHD youth visits were managed by psychiatry and neurology specialists. Health maintenance organization insurance was the reimbursement source for 17.9% of non-ADHD youth visits but only 11.7% of ADHD youth visits. Complex medication therapy was more likely to be prescribed by psychiatrists and less likely to be related to visits with health maintenance organization reimbursement.

Conclusions: National survey estimates in the 1990s confirm the substantial increase in visits for youths diagnosed as having ADHD, with more than three quarters of these visits associated with psychotherapeutic medication treatment. Physician specialty and reimbursement source variables identify distinct patient populations with a gradient in psychotherapeutic medication patterns from single-drug standard (stimulant) therapy to complex multidrug treatment regimens for which evidence-based scientific information is lacking.


SURVEYS OF physicians’ prescribing practices are varied and include mailed questionnaires, medical chart reviews, clinic and school surveys, statewide triPLICATE prescription databases, systematic physician sampling from public or proprietary organizations, Medicaid prescription claims data, and responses from a practice network of a volunteer group of physician specialists. The benefits and limitations of each approach are discussed elsewhere.

Of the systematic physician sampling surveys available, the one with the most widespread application, a high response rate, and the most representative sample is the annual National Ambulatory Medical Care Survey (NAMCS), conducted by the National Center for Health Statistics (NCHS). The data from this survey have been used in numerous studies of adult visits and occasional studies of youth visits to evaluate trends in office-based medical practice.

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Two recent reports featured data from NAMCS surveys and focused on the treatment of attention-deficit/hyperactivity disorder (ADHD) for youths. Based on NAMCS data from the 1995 survey, Zarin et al showed that primary care physicians...
METHODS

SOURCE OF DATA

The NAMCS is the source of data for this study. The NAMCS is a federally sponsored survey conducted annually by the NCHS. Sampling of office visits aims to achieve a nationally representative group of physicians in office-based practices. Data from the years 1989 through 1996 are presented separately for the trend analyses and as an 8-year combined sample for the analysis of descriptive characteristics. The combining of annual data is intended to provide as large a sample as possible to improve the reliability of the estimates from the subgroup analyses.

SURVEY DESIGN

The NAMCS 3-stage sampling plan involves the following: (1) primary sampling units based on geographic locale, (2) a probability sample of practicing physicians within the primary sampling unit, and (3) a systematic random sample of visits to these physicians based on a 1-week sampling period. Response rates across all physician specialties ranged from 70% to 74% during the 8 survey years.

Each NAMCS visit is given a weight that reflects the probability of selection, adjustments for nonresponse, and poststratification based on information about the number of physicians in each specialty group. Using these weights, it is possible to estimate the total number of office visits and the proportion of visits with various characteristics made by the US population. Sample estimates are expressed as the weighted mean percentage of visits, and variability in the estimate due to sampling error is indicated by 95% confidence intervals (CIs).

conducted 75.4% of office visits for youths with ADHD compared with 12.4% conducted by psychiatrists. Office visits for ADHD among youths younger than 15 years were defined as having either an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis of ADHD or a stimulant recorded during the visit. At the November 1998 National Institutes of Health Consensus Development Conference, Hoagwood presented ADHD office visit data from NAMCS for 0- to 17-year-olds. The study focused on the yearly percentages of mental health diagnostic services, psychotherapy, and mental health counseling and showed great variation among the individual study years presented. Using 1996 data, the author compared the services offered by 3 physician specialty groups. Psychiatrists were found to offer more mental health diagnostic and counseling services than primary care practitioners from pediatrics and family medicine. However, this study did not assess the relationship between ADHD psychotherapeutic medication treatment and physician specialty, reimbursement source, and comorbid diagnoses.

This study aims to describe findings and trends based on 1989 to 1996 NAMCS data of 5- to 14-year-olds treated for ADHD and to examine medication patterns in greater detail than in previous studies. Specifically, (1) 8-year trends for ADHD youth visits and stimulant-related visits are presented; (2) the influence of patient demographics, reimbursement source, and physician specialty is analyzed in relation to ADHD youth visits vs non-ADHD (other) youth visits, and ADHD psychotherapeutic medication vs nonpsychotherapeutic medication visits; (3) the influence of patient and health system variables as well as comorbidities is assessed in relation to 3 medication regimens offered during ADHD treatment visits: stimulants alone, stimulants with other psychotherapeutic medication, and nonstimulant psychotherapeutic medications alone.

RESULTS

NATIONAL ESTIMATES OF 8-YEAR ADHD TRENDS

Figure 1 illustrates the increase of ADHD youth visits as a proportion of total youth visits. The estimated mean percentage of total youth visits that are ADHD youth

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CHARACTERISTIC OF ADHD YOUTH VISITS VS NON-ADHD (OTHER) YOUTH VISITS

When combined across 8 years, ADHD youth visits comprised an estimated 2.8% (95% CI, 2.3%-3.2%) of all youth visits. Comparisons of ADHD youth visits with non-ADHD youth visits (Table 1) shows that ADHD youth visits were significantly more likely to involve boys (79.6% [95% CI, 73.3%-85.7%] vs 51.5% [95% CI, 49.2%-53.7%]; P < .05). There was one race effect observed. The likelihood of the ADHD youth visit was significantly lower for visits with race classified as “other,” ie, Asian, Pacific Islanders, American Indian, Eskimo, and Aleut. The data showed the “other” group to be primarily Asian or American Indian. The ADHD sample included 21 cases with restlessness as the sole inclusion criterion. ADHD youth visits were less likely than non-ADHD visits to be conducted by a primary care provider (61.1% [95% CI, 53.8%-68.3%] vs 76.6% [95% CI, 74.9%-78.3%]; P < .05). By contrast, psychiatrists were more likely to conduct ADHD visits than non-ADHD (other) youth visits (24.7% [95% CI, 18.1%-31.2%] vs 1.0% [95% CI, 0.7%-1.2%]; P < .05). Comparing ADHD visits with non-ADHD visits in terms of reimbursement, ADHD visits were less likely to have HMO insurance coverage (11.7% [95% CI, 6.7%-16.6%] vs 17.9% [95% CI, 16.4%-19.3%]; P < .05). The proportions reimbursed by

ADHD Youth Visits

Two criteria were used to define the ADHD youth visit: (1) a diagnosis of ADHD according to the ICD-9-CM, ie, codes of 314.0 or 314.01 or 314.9; or (2) restlessness as the reason for the visit. For the individual study years, the sample of ADHD visits for 5- to 14-year-olds varied from a high of 157 in 1993 to a low of 54 in 1990. For the combined data set, almost all ADHD visits had the target ICD-9-CM diagnosis (n = 760; 97.3%), and the remainder (n = 21) had restlessness as the sole inclusion criterion.

PSYCHOTHERAPEUTIC MEDICATION VISITS

Psychotherapeutic medication visits had listed on the data collection form 1 or more of the following medication groups: stimulants, anxiolytics, hypnotics, anticonvulsants, antidepres- sant, antipsychotics, antiparkinson, lithium, and clonidine. Anticonvulsants excluded the subclass used for seizure disorder alone. For the 9 medication groups, the classification followed the American Hospital Formulary Service system. Youth visits for ADHD were characterized according to whether psychotherapeutic medication was listed or not. Further characterization of these medications resulted in the following categories according to their pharmacological complexity: (1) Stimulants alone were defined as standard therapy for the ADHD visit in which the only psychotherapeutic agent listed was a stimulant. (2) Psychothera- peutic agents other than stimulants were defined as complex therapy because little is established concerning the off-label use of these medications for youth; and (3) Stimulants in com- bination with other psychotherapeutic agents were defined as a complex therapy because multidrug regimens have less well-established outcomes than stimulants alone.

STATISTICAL METHODS

The percentages reported in this study represent weighted estimates and are annual estimates for the 8-year trend analyses. For a more detailed characterization of the ADHD visit in terms of patient and health service system variables, data from 8 consecutive years were combined to increase statistical power. Standard errors for the year-specific estimates were obtained using an approximate approach recommended by NCHS. This approach is based on regression coefficients that are provided by NCHS. Standard errors for proportions calculated from the pooled data from all the years were calculated using the year-specific estimates of the standard error described above and of the covariance between year-specific estimates that were estimated from information provided by NCHS. Further details are available from the authors (L.S.M. and J.F.G.).

Statistical comparisons of estimated proportions in distinct subgroups were made based on the estimated standard error of each proportion and the assumption that the 2 proportions were statistically independent. For the 3 group medication analyses, the groups were too small to provide reliable comparisons, necessitating a comparison of stimu- lants alone with the 2 complex therapy groups collapsed into a single (nonstandard therapy) group.

DIAGNOSTIC GROUPS

Total Youth Visits

Total youth visits represent youth visits for any reason or diagnostic condition. For the individual study years, the sample of visits made to any physician by 5- to 14-year-olds varied from a high of 3313 in 1991 to a low of 2081 in 1996. The decrease reflects the reduced sampling strategy of the NCHS survey design in later years. For the combined data set, the sample of visits made to physicians by 5- to 14-year-olds was 20 794. Total youth visits were divided into non-ADHD (other) youth visits (n = 20 013) and ADHD youth visits (n = 781).
either private or public insurance did not differ significantly, although slight increases were observed for ADHD youth visits reimbursed by public or combined insurance (Table 1).

ADHD YOUTH VISITS WITH AND WITHOUT PSYCHOTHERAPEUTIC MEDICATIONS

Of the ADHD youth visits, an estimated 77.0% (95% CI, 70.6%-83.4%) had 1 or more psychotherapeutic medications recorded for the visit. In the medication vs no medication comparisons, minor differences were observed for physician specialty; psychiatry and neurology visits were more likely to occur among those not receiving psychotherapeutic medication, whereas more ADHD medication visits occurred among primary care and “other” medical specialties. Youth visits for ADHD medication were comparatively less likely to have HMO reimbursement. Finally, visits showing comorbid conduct disorder were more prominent among youths taking medication (4.3% vs 1.7%), although these numbers did not reach statistical significance.

MEDICATION PATTERNS AMONG ADHD YOUTH VISITS WITH PSYCHOTHERAPEUTIC MEDICATION

Table 2 illustrates 3 patterns of ADHD medication visits: standard stimulant therapy, psychotherapeutic agent(s) other than stimulants, and combination of stimulant therapy with other psychotherapeutic agent(s).

The majority of medication visits (82.8% [95% CI, 76.3%-89.4%]) reported only stimulant therapy, the standard treatment officially indicated for this disorder. Two comparably sized groups received more complex pharmacological therapy: 7.6% (95% CI, 3.2%-12.0%) received 1 or more psychotherapeutic agents other than stimulants, while 9.6% (95% CI,
4.4%-14.7%) received both stimulant medication and other psychotherapeutic agent(s). Comorbid diagnoses of depression or a disruptive behavior disorder were the predominant additional diagnoses for all groups but were especially common in the complex therapy groups (Table 2).

The medications reported for complex therapy are shown in Table 2. Youth visits for ADHD with other psychotherapeutic agents alone (column 2) involved treatment with antidepressants (64.2% [95% CI, 34.6%-93.7%]), clonidine (22.8% [95% CI, 0%-48.4%]), and antipsychotics (7.8% [95% CI, 0%-27.3%]). When stimulants were combined with other psychotherapeutic agents (column 3), the other groups also featured antidepressants (44.9% [95% CI, 16.8%-72.9%]) and clonidine (32.6% [95% CI, 6.4%-58.7%]), with a similar proportion of visits with antipsychotics (7.9% [95% CI, 0%-23.2%]). Comorbid disruptive behavior disorders were most prominent in the youths receiving stimulants plus other medication (column 3). Comorbid depression estimates, albeit unstable, did not show a consistent increase between columns.

Inspection of the CIs in Table 2 shows that many estimates are too small to make reliable statistical comparisons. To reduce this problem, standard treatment visits (column 1) were compared against columns 2 and 3 combined.

Nonsignificant but notable differences in the patient characteristics of the stimulant alone vs complex therapy (column 2 plus column 3) suggest that complex therapy is probably more often associated with white patient visits and the older age group (10-14 vs 5-9 years old). Complex therapy visits were 12 times more likely to be associated with comorbid depression and 3 times more likely to be associated with disruptive behavior disorders.

More robust findings occurred for the health service system variables. Visits involving stimulants alone were more likely to be reimbursed by HMO insurance than visits involving complex therapy (13.1% [95% CI, 6.5%-19.7%] vs 2.8% [95% CI, 0%-9.2%; P<.05]). Visits involving stimulants alone were more likely to be conducted by primary care physicians than were visits involving complex therapy (66.2% [95% CI, 57.7%-74.8%] vs 32.6% [95% CI, 12.9%-52.4%; P<.05]). By contrast, psychiatrists were more likely to conduct visits with complex therapy (51.5% [95% CI, 30.8%-72.1%] vs 20.0% [95% CI, 12.5%-27.5%; P<.05]).

A summary of complex therapy visits (combined columns 2 and 3) shows that ADHD medication visits involved the following ranking of other psychotherapeutic agents: antidepressants (53.4% [95% CI, 32.7%-74.1%]), clonidine (28.3% [95% CI, 9.7%-46.8%]), and antipsychotics (7.8% [95% CI, 0%-20.0%]).
Physician office visits for youths diagnosed as having ADHD among those in the typical ADHD age group (5-14 years old) increased 90% in the United States during the 1990s. This finding from NAMCS corroborates the estimate by Swanson et al14 from a proprietary data source (the Scott-Levin Physician Drug and Diagnosis Audit) for the 4-year period from 1990 to 1993. The present analysis shows that the majority of ADHD visits (77%) included a psychotherapeutic agent (mainly stimulants). Stimulant treatment as part of an ADHD visit rose 21% proportionally from 1989 through 1996. A similar change was reported at the November 1998 Consensus Development Conference for ADHD held in Bethesda, Md.12

The lower prevalence of ADHD office visits in an HMO setting compared with visits to clinics and to the offices of private physicians was also reported in a 1985 NAMCS-based study15 and in other studies. Examples include a special education population,16 a statewide Medicaid population,16 and a regional staff model HMO population.15 This range of findings lends support to the current ones derived from the recent composite NAMCS survey.

The major medical specialties caring for youths with ADHD are in the primary care sector (61% of ADHD visits) serviced largely by pediatricians and family practice physicians, a finding well known in the practice community.17 However, our office visit data also show that psychiatrists conducted 25% of the ADHD visits. The fact that psychiatrist office visits comprised one quarter of all ADHD office visits can be partially explained by the greater frequency of their visits relative to those of primary care physicians. Pediatricians see youths with ADHD for follow-up care an average of only 3 or 4 times a year.18 The average psychiatrist sees children with ADHD far more often. In the Practice Research Network survey sponsored by the American Psychiatric Association, when reporting on the ADHD cases, most patients were seen by psychiatrists 1 or more times per month, and 12% of patients were seen 3 or more times a month.19

Primary care physicians conducted the majority of ADHD visits involving stimulants alone. The coprescription of nonstimulant psychotherapeutic agents was likely to be written by psychiatrists and was likely to include antidepressants (45%), clonidine (33%), and antipsychotics (8%). Nonstimulant psychotherapeutic agents prescribed alone for ADHD by psychiatrists comprised primarily the same 3 medication types.

In sum, there are major differences in physician prescribing practices for the treatment of ADHD when comparing the practice of primary physicians with that of psychiatrists. Psychiatrists prescribe stimulants alone less often, prescribe stimulants in conjunction with other psychotherapeutic agents more often, and prescribe nonstimulant psychotherapeutic agents alone more often to treat youths with ADHD. The findings relating to psychiatric practices are similar to those of Zarin et al,19 who reported in the Practice Research Network survey (mentioned above), that 49% of youths with ADHD treated by psychiatrists with medication were concomitantly prescribed more than 1 psychotherapeutic agent. The frequent use of multidrug regimens by psychiatrists is presumably, in part, related to referrals by primary care physicians when treatment with standard therapy is inadequate and when comorbid psychiatric features become important.15,20

Our complex therapy findings highlight the frequent use of medications for off-label indications for youths with ADHD. In the Practice Research Network survey, 55% of patients treated for ADHD were prescribed nonstimulant psychotherapeutic medications—usually concomitantly.16 These nonstimulant medications include tricyclic antidepressants (17%), α-agonists (primarily clonidine) (23%), and antipsychotics (8%).

LIMITATIONS

The limitations of this study relate primarily to limitations in the NAMCS. First, the relationship between medicated individuals (medication prevalence based on the eligible population) and medication visits (rate of medication prescribed during office visits) is unknown. Therefore, comparisons between these 2 measures are inappropriate. Second, the relatively large proportion of psychiatrist visits compared with primary care visits for ADHD may reflect the greater probability of being included in the sample for the more frequently seen (chronic) individual. Third, subgroup analyses are suggestive of clinically important proportional differences but larger samples are needed to corroborate these findings. Fourth, the lack of longitudinal data limits our analysis of the therapeutic relationship between ADHD, a comorbid diagnosis, and multiple psychotherapeutic medications. Fifth, combining data from 8 years was necessary for statistical purposes. However, pooling the data precluded observation of secular trends during that period, eg, the gradual increasing use of antidepressant therapy.

IMPLICATIONS

The findings are relevant for clinical practice, policy development, and research. In the clinical practice realm, differences across health plan types and physician specialty need further explanation. To aid in this approach, therapeutic monitoring protocols should be developed so that patient differences are identified and more systematic evaluation of therapy for various groups of patients can be undertaken. In particular, drug monitoring protocols should lessen unnecessary switching, delayed dose adjustments, and the dilemma of treating drug-induced behaviors as if they were new behavioral (comorbid) conditions. Monitoring protocols in clinical settings where patients are often seen over a prolonged time would be particularly useful so that in the course of clinical decision making, effectiveness and satisfaction can be systematically studied. This approach draws on findings from a recent study23 showing that physicians’ continuity of care substantially improves their recognition of youths’ need for medication and for psychosocial treatment. Specialty clinics for ADHD, particularly in high-efficiency pediatric HMO settings, could avoid the problem of youths seeing various providers in short, infrequent visits wherein the provider cannot judge subtle
behavioral changes in the course of treatment for a behavioral disorder.

Second, clinical policy development for ADHD should be cautious. A rush to implement broad (consensus) guidelines or to overestimate the effectiveness and minimize the potential problems of multiple medication therapy without regard to nonpharmacological treatments (child therapy, family therapy, or educational interventions) is hazardous. Nor is it useful to ignore the importance of having multiple dimensions of behavioral reporting (school as well as family) when the research evidence for this approach is strong. Further, broad guidelines are likely to ignore important patient population differences that could drive therapy in unsatisfactory ways. Specifically, at least 2 distinct populations exist based on data from standard and complex therapy visits.

Third, priority in research should be given to off-label use of medications for youths (particularly for multidrug regimens), medication effectiveness research based on effects in the usual practice setting, and long-term multidimensional outcomes. Before undertaking expensive extended clinical effectiveness trials, longitudinal information of patients with ADHD in the usual practice setting should be provided. These cohort studies can help to separate the role of the severity of the disorder, the continuity of medication use, and the outcomes of treatment by different physician specialties.

Complex therapy based on multiple medications for comorbid disorders is of growing concern, and government research leaders urge effectiveness studies:

Children with concurrent attentional, affective, and tic disorders may be prescribed various drugs, including stimulants, antidepressants, clonidine, and mood stabilizers. Almost no data, however, exist about the efficacy and safety of these combinations, and the rationale for their use is not always sound.22

CONCLUSIONS

National survey estimates in the 1990s confirm the substantial increase in physician visits for ADHD among youths, with more than three quarters of these office visits involving prescription of psychotherapeutic medications for ADHD treatment. Physician specialty and reimbursement source variables identify distinct patient populations with a gradient in psychotherapeutic patterns from single-drug standard (stimulant) therapy to complex multidrug treatment regimens for which evidence-based scientific information is lacking.

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