Effects of Patient and Physician Characteristics on the Prescribing of Antidepressants

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BACKGROUND

➢ Many studies have examined a variety of factors that influence the prescribing of antidepressants, however, the results have not been entirely consistent.

➢ Some studies, for instance, suggested that older age groups are more likely to receive antidepressants, while some showed the opposite. A possible explanation is the heterogeneous effect within a group.

➢ Model misspecification, or the lack of an interaction term, could lead to the inconsistent estimate of effect of a variable. Different modeling strategies might shed light on identifying explanatory variables.

OBJECTIVES

➢ To implement a classification tree algorithm — Exhaustive CHAID (Chi-square Automatic Interaction Detection), to explore factors influencing the prescribing of antidepressants among office-base ambulatory cares in the United States. The algorithm is a relatively new approach to health research but has been commonly used in marketing research.

METHODS

➢ Study design: retrospective cross-sectional study

➢ Data: 1997~2001 National Ambulatory Medical Care Survey (NAMCS)

➢ Inclusion criteria: office visits with complete data.

➢ Theoretical framework: Eisenberg's prescribing model

➢ Dependent variables: the prescribing of antidepressants (Yes/No)

➢ Explanatory variables:

   ➢ Physician Characteristics: physician specialty

   ➢ Patient characteristics: age, gender, race, and payment source

   ➢ The relationship between physician and patient: whether the physician had seen the patient before (old/new patient), whether the physician was the patient's primary care physician (PCP), whether the patient reported any depressive symptoms, whether the patient was diagnosed with depression, and the duration of a visit

   ➢ The physician's relationship with health care system: whether the physician practiced independently or in collaboration (solo/non-solo), and the location (MSA/non-MSA) and census region (e.g. Northeast, etc.) of a physician's practice

RESULTS

➢ 113,128 office visits met the inclusion criteria.

➢ About 6.7% of them were prescribed at least 1 antidepressant between 1997 and 2001.

➢ From these 13 candidate explanatory variables, the Exhaustive CHAID algorithm automatically selected the ones that can best differentiate the groups with respect to the likelihood of prescribing an antidepressant. The algorithm also detected the interaction effects.

➢ Out of the 13 variables that were entered in the Exhaustive CHAID analysis, 11 were selected to grow the tree and 65 leaf/terminal nodes or subgroups were created. (Figure)

➢ The 11 variables that were significantly associated with the prescribing of antidepressants were: diagnosis of depression, reporting depressive symptoms, payment source, duration of visit, patient age, patient gender, physician specialty, whether the physician was the patient primary care physician (PCP), old/new patient, solo practice, MSA/non-MSA, and the region of the practice.

Figure. Classification tree of antidepressant prescribing

➢ Have a diagnosis of depression was the first and most important variable selected to discriminate the prescribing of antidepressants.

➢ For those who were diagnosed with depression, source of payment was the next most important variable to be selected to split the node. In contrast, for those who were not being diagnosed with depression, physician specialty was the next most important variable.

➢ Different sequence of explanatory variables appeared in various branches indicates a differential importance of variables in respective subgroup.

➢ The results of the tree diagram suggests at least 3 important interaction effects, i.e., the interactions between physician specialty and solo practice, between patient age and diagnosis of depression, and between whether the physician was the patient PCP and a patent was diagnosed with depression.

➢ For instance, those who were diagnosed with depression, younger patients were more likely to receive an antidepressant. In contrast, for those without a diagnosis of depression, older patients were more likely to receive antidepressants.

Terminal nodes in Exhaustive CHAID Tree

Terminal Nodes Description	Node ID	Number of Visits	Prescribing Rate (%)
Diagnosed, private insurance, psychiatrist, time<=30	72	564	85.8
Diagnosed, Medicare/Medicaid/Others, psychiatrist, no symptom	74	277	76.9
Diagnosed, private insurance, psychiatrist, time>30	73	544	71.7
Diagnosed, Medicare/Medicaid/Others, psychiatrist, reported symptom	75	343	69.7
Diagnosed, private insurance, PCP/other specialties	30	469	68.2
Not diagnosed, other specialties, 10<time<=14, non-solo	40	614	0.7
Not diagnosed, other specialties, time<=9, age<=40	34	1914	0.5
Not diagnosed, other specialties, 14<time<=15, age<=8	41	495	0.4
Not diagnosed, other specialties, 9<time<=10, male, not revisited patient	79	511	0.2
Not diagnosed, PCP specialty, age<=8	18	6378	0.1

➢ There was a substantial difference in prescribing rates among 65 subgroups. The table above listed the 5 highest and lowest groups.

➢ The group of patients that most likely to receive antidepressants (node 72) are those diagnosed with depression, having private insurance as payment source, seeing physicians with a specialty in psychiatry, having a duration of visit (time) of less than or equal to 30 minutes.

CONCLUSIONS

➢ The physician characteristics, the patient characteristics, the relationship between physician and patient, and the physician's relationship with healthcare system have influenced the prescribing of antidepressants.

➢ Exhaustive CHAID models provide a good visual presentation of relative importance of the variables.

➢ The 3 interaction effects detected by Exhaustive CHAID clarified some of the inconsistencies in the previous studies.

Note: This study was based upon a thesis in partial fulfillment of the requirements for the Master degree at the Graduate College of the University of Illinois at Chicago.