

Gender and Other Factors Associated with the Nonmedical Use of Abusable Prescription Drugs

**Linda Simoni-Wastila, Ph.D.,^{1,*} Grant Ritter, Ph.D.,² and
Gail Strickler, M.S.²**

¹Department of Pharmaceutical Health Services Research,
University of Maryland School of Pharmacy, Baltimore,
Maryland, USA

²Schneider Institute for Health Policy, Heller Graduate School,
Brandeis University, Waltham,
Massachusetts, USA

ABSTRACT

Although there is extensive research on gender differences in the use of alcohol and illicit substances, few studies have examined gender differences in nonmedical prescription drug use. Using data from the 1991 National Household Survey on Drug Abuse (NHSDA), based

*Correspondence: Linda Simoni-Wastila, Ph.D., Associate Research Professor, University of Maryland, School of Pharmacy, Department of Pharmaceutical Health Services Research, 515 West Lombard Street, Room 275, Baltimore, Maryland 21201, USA; Fax: 410-706-1736; E-mail: lsimoniw@rx.umaryland.edu.

on a sample of 3185 persons, logistic regression analysis is employed to determine how gender and other factors affect the likelihood of past-year nonmedical prescription drug use. Analysis revealed that women are significantly more likely than men to use any prescription drug, and that this gender difference is primarily driven by women's increased risk for narcotic analgesic and minor tranquilizer non-medical use. Other factors, such as race, age, health status, and other substance use, also are significant predictors of nonmedical use. Findings from this study will enable researchers, policy makers, and providers to have a greater understanding of nonmedical drug use patterns and support greater gender sensitivity in the prevention, education, and treatment of nonmedical prescription drug use.

Key Words: Prescription drugs; Nonmedical use; Nonmedical prescription drug use; Gender differences; Abuse potential; Problem prescription drug use; Dependency; Abuse; Risk factors.

INTRODUCTION

The problem of nonmedical use of prescribed drugs is immense. It is estimated that 9.5% of the U.S. population aged 12 and older have engaged in this practice at least once in their lives (Substance Abuse and Mental Health Services Administration, 1997a). The nonmedical use of prescription drugs, which includes narcotic analgesics, stimulants, sedative-hypnotics, and minor tranquilizers, exceeds the combined use of heroin, crack cocaine, and inhalants (Substance Abuse and Mental Health Services Administration, 1997a). Yet, despite its relative significance, there is a paucity of research devoted to understanding the risk factors associated with nonmedical prescription drug use.

Although gender differences in the use of illicit substances and alcohol have been the subject of extensive research, very few studies have examined gender differences in nonmedical prescription drug use. Current epidemiological evidence of substance use patterns in the United States demonstrates that men use (Substance Abuse and Mental Health Services Administration, 1997a) illicit drugs and alcohol to a greater extent than do women (Substance Abuse and Mental Health Services Administration, 1997a; 1997b). Among individuals of all ages, males are almost five times more likely than females to be "heavy drinkers" and nearly two and one-half times more likely to engage in weekly marijuana use (Substance Abuse and Mental Health Services Administration, 1997a). Men also are more likely than women to report lifetime misuse of



cigarettes, cocaine, and heroin (Substance Abuse and Mental Health Services Administration, 1997b). What is not known is whether men are more likely to nonmedically use or misuse prescription drugs than women.

The few reports and studies that have considered gender differences in nonmedical prescription drug use have clear limitations. Although one report concluded that men are more likely than women to misuse drugs, including prescription drugs, the analysis only cursorily examined nonmedical prescription drug use and failed to incorporate a number of explanatory variables, such as health status, insurance, and socio-economic status (Substance Abuse and Mental Health Services Administration, 1997b). Others report anecdotal findings of women's greater nonmedical prescription drug use, but provide little to no empirical evidence (The National Center on addiction and Substance Abuse at Columbia University, 1998; Szwabo, 1993).

There is reason to believe that women have an increased propensity to nonmedically use prescription drugs. If one assumes that continued medical exposure to a substance is likely to lead to misuse or "abuse"^a of that substance, then women may very well be at high risk for nonmedical prescription drug use. Numerous studies document that women are more likely than men to be exposed to psychoactive prescription drugs with abuse potential (Cafferata and Meyers, 1990; Clayton et al., 1986; Cooperstock and Parnell, 1982; Cottler and Robins, 1983; Hohmann, 1989; Johnston et al., 1985; Mellinger et al., 1984; Simoni-Wastila, 1998, 2000; Svarstad et al., 1987; Swartz et al., 1991; Verbrugge, 1985; Wells et al., 1985). Specifically, women are more likely to use, in a medical context, narcotic analgesics and minor tranquilizers (Hohmann, 1989; Simoni-Wastila, 1998, 2000). Indeed, it is estimated that women are 33% more likely than men to be prescribed a narcotic analgesic and 37% more likely to be prescribed a minor tranquilizer (Simoni-Wastila, 1998). Although current evidence suggests that there are no gender differences in the medical use of sedative-hypnotics or stimulants (Simoni-Wastila, 1998), earlier studies have found women more likely to be prescribed these drugs (Clayton et al., 1986; Johnston et al., 1985). In addition to greater medical exposure to prescribed drugs, biological and physiological differences may make women more susceptible than men to effects, such as dependency and withdrawal, associated with prescription drug use (Gear et al., 1996; Leung et al., 1995).

^aThe journal's style utilizes the category *substance abuse* as a diagnostic category. Substances are used or misused; living organisms are and can be *abused*. Editors note.



In addition to gender, there are other important explanatory factors predicting the medical use of psychoactive drugs, including age, socioeconomic status, psychological and social well-being, mental and physical health, psychic distress, polydrug use, and physician specialty (Beardsley et al., 1988; Cafferata and Meyers, 1990; Cooperstock and Parnell, 1982; Cottler and Robins, 1983; Hallfors, 1992; Hohmann, 1989; Hohmann et al., 1991; Mellinger et al., 1978; Olfson and Pincus, 1994; Parry et al., 1973; Swartz et al., 1991; Takala et al., 1993; Wastila and Bishop, 1996). Other studies suggest that concurrent use of alcohol and illicit substances may be linked to nonmedical prescription drug use (Iguchi et al., 1993; Wesson et al., 1997). It is quite likely that many factors associated with medical use are predictive of nonmedical prescription drug use as well. Further, many of these explanatory variables may be inextricably linked with gender. For example, some research suggests that female gender and older age increase the likelihood of nonmedical use of psychoactive prescribed medicines (Bernstein et al., 1989; Jorgensen et al., 1993; Koch and Campbell, 1983; Willcox et al., 1994).

The purpose of this article is to examine the role of gender in predicting the nonmedical use of prescription drugs with misuse potential. Using data from the 1991 National Household Survey on Drug Abuse (NHSDA), logistic regression analysis is employed to determine how subject characteristics, including being female, affect the likelihood of past-year nonmedical prescription drug use. Our analysis models the probability of self-reported prescription drug use, overall and for four therapeutic drug classes: narcotic analgesics, minor tranquilizers, stimulants, and sedative-hypnotics. Our findings will enable researchers, policy makers, and providers to have a greater understanding of substance use patterns and support greater gender-based sensitivity in the prevention, education, and treatment of the nonmedical use of prescription drugs.

DATA AND METHODS

Data

This study uses data from the 1991 NHSDA, a multistage area probability sample of households designed to represent the noninstitutionalized population of the United States age 12 years and older. The NHSDA is a principal source of data on the prevalence of substance misuse in the country and is conducted annually. In 1991, a total of 32,594 individuals were surveyed in English or Spanish in their homes by trained interviewers. Data collected on these individuals include demographics,



socioeconomic status, self-reported lifetime, past-year, and current drug (including prescription drug) and alcohol use, perceptions of risk for drug misuse, legal history, and problems with drug use. The 1991 NHSDA is used rather than more current NHSDA data because it is the only year that provides adequate sample size to examine prescription drug use in detail by therapeutic category. Because the NHSDA captures only individuals residing in households, it is unable to provide estimates of substance use in typically hard-to-reach populations, including those who are incarcerated, homeless, or otherwise institutionalized, who may be at greatest risk for substance use problems.

For this analysis, we constructed a subsample of all past-year nonmedical prescription drug users ($n=1641$) combined with a 5% random sample of all nonusers ($n=1544$), yielding a total sample size of 3185. For analyses of individual therapeutic classes, our study samples consisted of the 5% random sample ($n=1544$) of all prescription drug nonusers combined with all past-year nonmedical users of that particular drug class. Thus, resulting sample sizes for each drug class are: narcotic analgesics ($n=2503$), tranquilizers ($n=2118$), stimulants ($n=2055$), and sedative-hypnotics ($n=1949$). Constructed samples are used because logistic models using the entire NHSDA sample ($n=32,594$) resulted in an overly high rate of falsely identified past-year prescription drug users. In logistic regressions such constructed samples provide consistent estimates of all parameters except for the intercept (Ben-Akiva and Lerman 1991).

Variable Definitions

In the NHSDA, nonmedical prescription drug use is defined as "... any use on your own that is either without a physician's prescription, in greater amounts than prescribed, more often than prescribed, or for any other reasons other than a physician said you should take them..." (Substance Abuse and Mental Health Services Administration, 1993). For this study, five dichotomous dependent variables are constructed to reflect any past-year nonmedical prescription drug use, as well as past-year narcotic analgesic, minor tranquilizer, stimulant, and sedative-hypnotic use.

The exploratory variable of interest is gender, with male as the referent category. Selection of other covariates in our models was guided by earlier studies (Cafferata and Meyers, 1990; Clayton et al., 1986; Cottler and Robins, 1983; Hohmann, 1989; Johnston et al., 1985; Mellinger et al., 1984; Mellinger et al., 1978; Parry et al., 1973; Simoni-Wastila, 1998, 2000;



Svarstad et al., 1987; Swartz et al., 1991; Verbrugge, 1985; Wells, et al., 1985) and from review literature (The National Center on Addiction and Substance Abuse at Columbia University, 1998; Cooperstock and Parnell, 1982; Szwabo, 1993). Candidate demographic variables selected on this basis include: race [nonwhite (Blacks, Asians, Hispanic ethnicity, and “Other”) is referent], age (five age categories, with age range 35–64 referent), and marital status (married is referent). Socioeconomic variables chosen include: health insurance status (uninsured is referent), total family income (annual income less than \$20,000 is referent), and health status (being in good or excellent health is referent). Indicators of daily alcohol use (nondaily use is referent) and past-year use of illicit substances (marijuana, hallucinogens, cocaine, heroin, and inhalants other than prescription drugs) are included in order to adjust for poly-substance use. Daily alcohol use refers to at least one drink (of wine, beer, or spirits) daily during the preceding month; past-year use of illicit substances includes use of any illicit substance one or more times in the preceding year.

METHODS

Frequencies and proportions are provided to describe the analytic sample. We also conducted bivariate analyses of gender differences in the dependent and explanatory variables. Unadjusted odds ratios from 2×2 contingency tables of dependent variables with the explanatory variables are reported to examine the association of nonmedical prescription drug use with the independent variables. All differences are reported at a statistical significance level of $p \leq 0.05$ or better.

We use logistic regression to model the probability of any past-year nonmedical prescription drug use overall and within the four therapeutic classes. Most analyses use full regression models that include all considered covariates, thereby avoiding the issue of multiple t -testing, a problem inherent in stepwise methods. A reduced model, excluding daily alcohol and illicit drug use in predicting any nonmedical prescription drug use, is reported to examine the gender effect when these variables are removed.

For the logistic models predicting any nonmedical prescription drug use, reported results include estimated beta coefficients, Wald chi-square tests, odds ratios and their associated 95% confidence intervals (95% CI), and significance levels. For other logistic analyses, odds ratios, 95% CIs, and significance levels are reported. Diagnostics for all models include log likelihood estimates, false positive and false negative rates, and the Hosmer-Lemeshow goodness-of-fit chi-square statistic. Statistical



Analysis Software (SAS) statistical software is used for analysis (SAS Institute, 1990); SUDAAN statistical software is used to adjust for clustering inherent in the multistage probability sampling approach used in the NHSDA (Shah et al., 1995). SUDAAN adjusts standard deviation estimates for the differential probability of unit selection at the various sampling stages (Shah, 1995). Generally, the use of SUDAAN increases the standard deviation estimates and decreases the significance of each factor relative to analyses using SAS alone (Shah et al., 1995).

Although the NHSDA allows weighting to provide national estimates of incidence and prevalence, the use of weights resulted in too high false positive rates in preliminary analyses. Therefore, we present findings from the logistic regressions using unweighted data. Because we are primarily interested in the odds of gender and other explanatory variables as predictors of nonmedical prescription drug use, we chose odds ratios as our primary statistic. Odds ratios are invariant under all weighting schemes (including using unweighted data) and for all sample designs (Fleiss, 1982).

RESULTS

Sample Characteristics

A total of 3185 respondents age 12 or older comprise the study sample (Table 1). Analysis reveals that the study sample is predominantly female (56.4%), white (54.2%), and unmarried (72.6%). Those aged 12–34 comprise nearly 80.0% of the sample, with 17.1% aged 35–64 and 3.5% aged 65 and older. More than 76.0% had some form of health insurance, and 40.8% reported annual family income of less than \$20,000. Respondents generally reported their health status as good or excellent, with only 12.9% reporting poor to fair health. A small proportion (13.4%) of respondents reported having at least one alcoholic beverage of wine, beer, or spirits on a daily basis, and 35.2% reported using at least one illicit substance (not including alcohol or prescription medications) in the prior year. By design, approximately 50% of respondents in the sample reported past-year nonmedical use of at least one prescription drug. For the therapeutic classes, 30.1% of respondents reported narcotic analgesic use, 16.0% reported stimulant use, 12.7% reported sedative-hypnotic use, and 18.0% reported minor tranquilizer use.

Females are more likely than males to be nonwhite, 65 years of age or older, unmarried, and have health insurance. Women also are more likely to report poor or fair health than their male peers. Males, on the other



Table 1. Explanatory and dependent variables in the analysis sample and differences in sample characteristics by gender.

Variable	Total sample (%) (<i>n</i> = 3185)	Males (%) (<i>n</i> = 1390)	Females (%) (<i>n</i> = 1795)
Total	100.0%	43.6%	56.4%
White ^a	54.2	56.5	52.5
Age			
12–17	23.6	25.1	22.7
18–24	24.6	25.7	23.7
25–34 ^a	31.3	29.6	32.0
35–64	17.2	16.5	17.6
65+ ^a	3.5	2.9	3.9
Not married ^a	72.6	74.2	71.3
Has health insurance ^a	76.1	73.4	78.2
Income			
<\$20,000	40.9	39.6	42.6
\$20,000–\$40,000	35.0	34.9	35.0
>\$40,000	23.9	25.5	22.4
Poor/fair health ^a	12.9	10.8	14.5
Daily alcohol use ^a	13.4	17.9	9.7
Past-year illicit drug use ^{a,b}	35.2	41.5	30.3
Past-year nonmedical Rx use	51.5	51.4	51.6
Narcotic analgesic use	30.1	29.5	30.6
Stimulant use ^a	16.0	17.6	14.8
Sedative use ^a	12.7	14.0	11.7
Minor tranquilizer use ^a	18.0	17.9	14.8

^aGender difference statistically significant at $p \leq 0.05$.

^bAny past-year marijuana, cocaine, hallucinogen, heroin, or inhalant substances. Does not include alcohol or any prescription drugs.

hand, are more likely than females to drink alcohol daily and use illicit substances than are females. Although both women and men appear equally likely to nonmedically use any prescription drug or narcotic analgesic, men are significantly more likely to report nonmedical use of stimulants, sedative-hypnotics, and minor tranquilizers.

Bivariate Analysis

Unadjusted odds ratios (OR) from contingency analysis reveal that a number of variables are likely to predict any past-year nonmedical use of



Nonmedical Use of Prescribed Drugs

Table 2. Probability of any past-year nonmedical prescription drug use, unadjusted odds ratios.

Variable	Odds ratio	95% CI	<i>p</i> value
Female	1.00	0.87–1.16	0.93
White	1.77	1.53–2.03	0.001
Age			
12–17	0.94	0.79–1.11	0.438
18–24	1.63	1.37–1.94	0.001
25–34	1.22	1.06–1.42	0.007
35–64	0.58	0.48–0.71	0.001
65+	0.22	0.14–0.35	0.001
Unmarried	1.36	1.15–1.60	0.001
Has health insurance	0.78	0.66–0.93	0.005
Income			
\$20,000–\$40,000	0.93	0.80–1.07	0.289
>\$40,000	1.16	1.00–1.36	0.055
Poor/fair health	1.34	1.10–1.62	0.003
Daily alcohol use	2.80	2.20–3.56	0.001
Past-year illicit drug use	9.50	7.84–11.52	0.001

prescription drugs (Table 2). Not controlling for the influence of other factors, gender does not have a statistically significant association with any prescription drug nonmedical use. Positive and significant factors of any nonmedical prescription drug use include being white (OR = 1.77, 95% CI = 1.53–2.03), age 18–24 (OR = 1.64, 95% CI = 1.37–1.94), age 25–34 (OR = 1.22, 95% CI = 1.06–1.42), unmarried (OR = 1.36, 95% CI = 1.15–1.60), in poor/fair health (OR = 1.34, 95% CI = 1.10–1.62), using alcohol on a daily basis (OR = 2.80, 95% CI = 2.20–3.56), and past-year use of illicit drugs (OR = 9.50, 95% CI = 7.84–11.52). Negative and statistically significant predictors include the age groups 35–64 and 65 and older and having health insurance (OR = 0.78, 95% CI = 0.66–0.93). Young age (12–17) and income variables were not significantly associated with any past-year nonmedical prescription drug use.

Probability of Past-Year Nonmedical Prescription Drug Use

Being female contributes significantly to the likelihood of any past-year nonmedical prescription drug use, controlling for daily alcohol use, past-year illicit drug use, and other factors (Table 3, full model).



Table 3. Relative likelihood of any past-year prescription drug nonmedical use, full and reduced models.

Variable	Full model ¹		Reduced model ²	
	Coefficient (Wald chi-square)	Odds ratio (95% CI)	Coefficient (Wald chi-square)	Odds ratio (95% CI)
Intercept	-1.36 (-)	—	0.82 (-)	—
Female	0.35 (15.47) ^a	1.43 (1.19–1.69)	0.05 (0.51)	1.05 (0.91–1.22)
White	0.48 (33.22) ^a	1.61 (1.37–1.89)	0.62 (70.83) ^a	1.85 (1.61–2.13)
Age				
12–17	0.25 (3.53)	1.28 (0.99–1.67)	0.27 (4.96) ^a	1.32 (1.03–1.67)
18–24	0.37 (6.14) ^c	1.45 (1.08–2.85)	0.71 (31.82) ^a	2.04 (1.59–2.56)
25–34	0.26 (4.08) ^b	1.30 (1.01–1.67)	0.56 (27.33) ^a	1.75 (1.41–2.17)
65+	-0.84 (10.03) ^b	0.43 (0.26–0.73)	-1.21 (22.33) ^a	0.30 (0.18–0.49)
Not married	0.03 (0.06)	0.97 (0.78–1.20)	0.30 (8.44) ^b	1.35 (1.10–1.64)
Health insurance	-0.11 (1.01)	0.89 (0.71–1.11)	-0.22 (5.79) ^c	0.81 (0.67–0.96)
Income				
\$20–40K	0.07 (0.47)	1.07 (0.88–1.32)	-0.01 (0.03)	0.99 (0.83–1.16)
> \$40K	0.24 (4.45) ^c	1.28 (1.02–1.61)	0.15 (2.36)	1.16 (0.96–1.41)
Poor/fair health	0.40 (10.38) ^b	1.49 (1.16–1.89)	0.52 (25.31) ^a	1.69 (1.37–2.08)
Daily alcohol use	0.55 (14.43) ^a	1.72 (1.30–2.33)	N/A	N/A
Illicit drug use	2.11 (409.34) ^a	8.33 (6.67–10.00)	N/A	N/A

¹The model classified 77.1 percent of cases accurately (-2 Log Likelihood Ratio = 838.64, df = 13, p = .0001, false positives = 18.7%, false negatives = 33.6%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 5.78$, df = 8, = 0.6717)

²The model classified 63.9 percent of cases accurately (-2 Log Likelihood Ratio = 207.76, df = 11, p = .0001, false positives = 40.4%, false negatives = 40.0%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 9.31$, df = 8, = 0.3171)

^aStatistically significant at $p \leq 0.001$ or better.

^bStatistically significant at $p \leq 0.01$ or better.

^cStatistically significant at $p \leq 0.05$ or better.



This analysis reveals that females have a 43% increased odds (95% CI = 1.19–1.69) of any past-year prescription drug use compared to males. Other variables also are significant predictors of any nonmedical prescription drug use, including white race (OR = 1.61, 95% CI = 1.37–1.89), age 18–24 (OR = 1.45, 95% CI = 1.08–2.85), reporting poor/fair health (OR = 1.49, 95% CI = 1.16–1.89), having an annual income of more than \$40,000 (OR = 1.28, 95% CI = 1.02–1.61), daily alcohol use (OR = 1.72, 95% CI = 1.30–2.33), and past-year use of illicit substances (OR = 8.33, 95% CI = 6.67–10.00). Being elderly (OR = 0.43, 95% CI = 0.26–0.73) decreases one’s likelihood of nonmedical prescription drug use.

To determine how sensitive these findings are to daily alcohol use and illicit drug use (two variables highly associated with being male (Substance Abuse and Mental Health Services Administration, 1997a, 1997b)), we ran a reduced logistic regression model without these two variables. As shown in the last two columns of Table 3, being female is not a statistically significant predictor of past-year nonmedical prescription drug use when other substance use variables are excluded. In addition, annual income greater than \$40,000 is not statistically significant in the reduced model. Conversely, several variables become statistically significant in the reduced model, including age 12–17 (OR = 1.32, 95% CI = 1.03–1.67), being unmarried (OR = 1.35, 95% CI = 1.10–1.64), and having health insurance (OR = 0.81, 95% CI = 0.67–0.96).

Probability of Nonmedical Use of Specific Prescription Drug Therapeutic Classes

Full-model logistic regression equations were estimated for each therapeutic class to determine if gender differences persist in predicting the probability of nonmedical use of each therapeutic category (Table 4). Analyses reveal that gender is not a statistically significant predictor of sedative-hypnotic or stimulant use, but does play a significant role in predicting tranquilizer and narcotic analgesic use. For presentation purposes, only odds ratios, their associated 95% CIs, and significance levels are reported.

The probability of past-year tranquilizer use is 54% greater for women than men, controlling for other factors (95% CI = 1.19–2.00). In addition, being white (OR = 2.38, 95% CI = 1.85–3.03), in poor/fair health (OR = 1.47, 95% CI = 1.03–2.13), using alcohol on a daily basis (OR = 1.92, 95% CI = 1.32–2.78), and past-year illicit drug use (OR = 14.29, 95% CI = 10.00–20.00) all increase the likelihood of



Table 4. Relative likelihood of sedative, stimulant, tranquilizer, and narcotic analgesic misuse—odds ratios (95% confidence intervals).

Variable	Sedatives ¹	Stimulants ²	Tranquilizers ³	Narcotic analgesics ⁴
Female	1.28 (0.97–1.69)	1.25 (0.94–1.64)	1.54 (1.19–2.00) ^c	1.41 (1.12–1.72) ^c
White	1.92 (1.43–2.63) ^c	2.50 (1.85–3.33) ^c	2.38 (1.85–3.03) ^c	1.75 (1.47–2.08) ^c
Age				
12–17	1.32 (0.81–2.13)	2.63 (1.49–4.54) ^c	0.54 (0.37–0.79) ^c	1.96 (1.43–2.63) ^c
18–24	0.85 (0.53–1.35)	2.38 (1.43–4.00) ^c	0.76 (0.53–1.10)	1.92 (1.35–2.70) ^c
25–34	0.82 (0.53–1.27)	1.52 (0.94–1.52)	0.98 (0.68–1.39)	1.43 (1.05–1.96) ^b
65+	0.61 (0.27–1.37)	0.60 (0.17–2.04)	0.25 (0.12–0.53) ^c	0.31 (0.14–0.68) ^b
Not married	0.91 (0.63–1.32)	0.80 (0.54–1.19)	1.05 (0.76–1.45)	0.79 (0.61–1.03)
Insured	0.86 (0.61–1.23)	0.78 (0.56–1.10)	0.86 (0.62–1.19)	1.01 (0.79–1.30)
Income				
\$20–\$40,000	0.75 (0.56–0.98) ^a	0.96 (0.72–1.30)	0.94 (0.71–1.23)	0.91 (0.72–1.14)
>\$40,000	0.81 (0.57–1.16)	0.79 (0.53–1.18)	0.99 (0.71–1.39)	1.01 (0.78–1.32)
Poor health	1.79 (1.22–2.63) ^b	1.49 (0.96–2.33)	1.47 (1.03–2.13) ^b	1.41 (0.09–1.85) ^b
Daily alcohol	2.63 (1.79–4.00) ^c	1.82 (1.20–2.78) ^b	1.92 (1.32–2.78) ^c	1.72 (1.27–2.33) ^c
Illicit drug use	12.50 (10.00–16.67) ^c	33.33 (20.00–50.00) ^c	14.29 (10.00–20.00) ^c	6.67 (5.56–8.33) ^c

¹The model classified 81.9 percent of cases accurately (–2 Log Likelihood Ratio = 538.89, df = 13, p = .0001, false positives = 33.9%, false negatives = 11.4%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 7.11$, = 8, = 0.5243)

²The model classified 89.1 percent of cases accurately (–2 Log Likelihood Ratio = 943.33, df = 13, p = .0001, false positives = 29.1%, false negatives = 8.2%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 8.78$, = 8, = 0.3612)

³The model classified 83.3 percent of cases accurately (–2 Log Likelihood Ratio = 697.30, df = 13, p = .0001, false positives = 30.9%, false negatives = 14.1%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 9.28$, = 8, = 0.3193)

⁴The model classified 75.5 percent of cases accurately (–2 Log Likelihood Ratio = 579.18, df = 13, p = .0001, false positives = 27.4%, false negatives = 25.3%, Hosmer-Lemeshow goodness-of-fit test $\chi^2 = 9.00$, = 8, = 0.3418)

^aStatistically significant at ≤ 0.05 or better

^bStatistically significant at ≤ 0.01 or better

^cStatistically significant at ≤ 0.001 or better



nonmedical tranquilizer use. Conversely, being very young (OR = 0.54, 95% CI = 0.37–0.79) or elderly (OR = 0.25, 95% CI = 0.37–0.79) relative to middle age decreases the likelihood of tranquilizer use. A number of factors, including ages 18–34, marital status, health insurance status, and family income, are not statistically significant.

Controlling for other factors, multivariate analysis shows that being female rather than male increases the likelihood of narcotic analgesic nonmedical use by 41% (95% CI = 1.12–1.72). Other positive and statistically significant predictors of narcotic analgesic use include being white (OR = 1.75, 95% CI = 1.47–2.08); being aged 12–17 (OR = 1.96, 95% CI = 1.43–2.63), 18–34 (OR = 1.92, 95% CI = 1.35–2.70), or 25–34 (OR = 1.43, 95% CI = 1.05–1.96) relative to middle age; poor/fair health status (OR = 1.41, 95% CI = 1.09–1.85); daily alcohol use (OR = 1.72, 95% CI = 1.27–2.33); and past-year illicit drug use (OR = 6.67, 95% CI = 5.56–8.33). Elders are 31% as likely as those middle-aged to misuse narcotic analgesics (95% CI = 0.14–0.68). Statistically insignificant predictors include marital status, health insurance coverage, and family income.

DISCUSSION

This study demonstrates that women are at increased risk for nonmedical prescription drug use relative to men, controlling for a number of explanatory variables. This risk, however, is not uniform across all drug categories; indeed, it appears that women are primarily susceptible to nonmedical tranquilizer and narcotic analgesic use. The lack of a gender effect in nonmedical sedative-hypnotic and stimulant use may be the result of lower prevalence rates due to lower prescribing of these drug classes since their peak use in the 1970s (American Psychiatric Association, 1990; Richard and Lasagna, 1988). Lower prevalence rates makes discerning statistically significant gender differences, if they do exist, somewhat more difficult. These findings are consistent with the previous and limited literature examining gender differences in non-medical prescription drug use (Substance Abuse and Mental Health Services Administration, 1997b; The National Center on Addiction and Substance Abuse at Columbia University, 1998; Szwabo, 1993) as well as with studies that have found women to have greater medical exposure to prescription drugs with abuse potential (Cafferata and Meyers, 1990; Clayton et al., 1986; Cottler and Robins, 1983; Hohmann et al., 1991; Johnston et al., 1985; Simoni-Wastila, 1998, 2000; Svarstad et al., 1987; Swartz et al., 1991; Verbrugge, 1985; Wells et al., 1985).



The lack of a gender effect in the reduced model demonstrates the need to control for alcohol and illicit drug use in conducting analyses of prescription drug use. The use of alcohol and illicit substances is much greater by males than females (Substance Abuse and Mental Health Services Administration, 1997a, 1997b), and not controlling for their use masks the relationship between gender and nonmedical prescription drug use. This masking is further compounded by the relatively high poly-use of alcohol (13.4%) and illicit substances (35.2%) seen in this analytic sample.

It is important to note that gender is not the only statistically significant predictor of nonmedical prescription drug use. Not surprisingly, illicit substance use is the strongest predictor of nonmedical prescription drug use in all models. A number of researchers note that prescription drug misuse rarely occurs in isolation, and that the majority of individuals who misuse prescribed medicines do so in conjunction with alcohol or illicit substances (American Psychiatric Association, 1987; Graham and Wilsnack, 2000; Iguchi et al., 1993; Wesson et al., 1997). Indeed, analysis of the NHSDA data shows that among past-year nonmedical prescription drug users, only 38.8% report prescription drug use alone (data not shown). The remaining past-year nonmedical prescription drug users report past-year illicit drug use and/or problem alcohol use as well. While multivariate analysis of the “prescription drug use only” subgroup is possible, the high false-positive user rate makes interpretation of findings difficult, and the small sample size precludes analysis by therapeutic category.

In addition, being white, young age, in poor to fair health, using alcohol on a daily basis, and past-year illicit drug use are all positive predictors for overall prescription drug use, as well as for minor tranquilizer and narcotic analgesic use. The finding that whites are more likely than nonwhites to nonmedically use prescription drugs has been noted in other studies (Substance Abuse and Mental Health Services Administration, 1997b; The National Center on Addiction and Substance Abuse at Columbia University, 1998), and is consistent with literature that shows less medical psychoactive drug use by nonwhites than whites (Hahn, 1995; Khandker and Simoni-Wastila, 1998). Other variables, notably total family income and the age groups, varied in their significance and effect on probability of prescription drug misuse.

The study’s finding that individuals aged 65 and older are less likely than those who are middle-aged to that nonmedical prescription drugs runs contrary to several studies and reports that portray older women as particularly “vulnerable” to prescription drug misuse and “abuse”



Nonmedical Use of Prescribed Drugs

15

(Bernstein et al., 1989; Jorgensen et al., 1993; Mellinger et al., 1978; Szwabo, 1993; The National Center on Addiction and Substance Abuse at Columbia University, 1998; Willcox et al., 1994). One explanation for this discrepancy is that the NHSDA data requests information on the nonmedical use of prescription drugs without also probing for medical use. Limited research suggests that nonmedical prescription drug use may be largely unintentional in elders and purposive in children and younger adults (Clayton et al., 1986). Thus, in the elderly, prescription drug use that is considered medical use may actually be harmful or, at the least, fall into the category of misuse. Finally, the NHSDA may not fully capture elders' nonmedical prescription drug use, because no effort was made to oversample this cohort to assure adequate sample size (Substance Abuse and Mental Health Services Administration, 1993). Other studies, however, have either shown no association between increasing age and psychotropic drug use (Simoni-Wastila, 1998) or that psychotropic drug use peaks at middle ages and then subsequently declines (Koch and Campbell, 1983; Parry et al., 1973).

Study's Limitations

This study has several limitations. The medical use of prescription drugs is a complex phenomenon that exhibits many dimensions, such as patient and provider perception, judgment, and decision-making. It is likely that these dimensions also play a key role in the nonmedical use of prescription drugs. Unfortunately, many of these dimensions are difficult to measure, especially in survey and administrative claims data.

Also, the data are nearly a decade old; however, available subsequent NHSDA versions have inadequate sample sizes to conduct multivariate analyses at the drug class level and, at the time of this analysis, the 1999 NHSDA data, with a sample size exceeding 70,000 respondents, was not yet publicly available (Substance Abuse and Mental Health Services Administration, 2000). We believe that our findings are current, however, as more recent NHSDA data has documented that the prevalence of nonmedical prescription drug use has remained relatively stable over time (Substance Abuse and Mental Health Services Administration, 1997a, 2000). Although the study relies on respondent self-report information, several studies have demonstrated that under-reporting with the NHSDA is not a significant problem (Harrison et al., 1993; Turner et al., 1992). Finally, it is important to not infer this study's findings to indicate predictors of prescription drug dependency or abuse, as these terms, defined using Diagnostic and Statistical Manual (DSM)



criteria, include aspects of use, such as tolerance and withdrawal, that are not captured in the NHSDA definition of nonmedical use.

CONCLUSIONS

This study is the first to document a clear gender difference in the nonmedical use of abusable prescription drugs. The analysis revealed that women are significantly more likely than men to nonmedically use any prescription drug. In particular, it appears that this gender difference may be primarily driven by the finding that women are at higher risk than men for narcotic analgesic and minor tranquilizer use. This study also shows that men and women are equally likely to nonmedically use stimulants and sedative-hypnotics. Other factors, including race, age, health status, and other substance use, also are significant predictors of prescription drug nonmedical use. Finally, this study suggests that identification of prescription drug nonmedical use may be difficult, especially among males, as it frequently occurs in conjunction with the use of other substances. The results from this study may help clinicians and others involved in the identification and prevention of nonmedical prescription drug use recognize individuals at increased risk.

Although this study is an important first step in understanding the extent of and factors associated with nonmedical prescription drug use, further research is required to confirm and elaborate upon these findings. For one, studies using alternative analytical methods, such as user and provider focus groups, in depth interviews, and surveys, would complement epidemiological analyses by providing greater depth and understanding of the complex phenomenon of nonmedical prescription drug use. Of critical importance is understanding whether and how medical exposure to potentially misusable prescription drugs may result in nonmedical use and, eventually, to misuse and dependency. It is by understanding this cascade of events, and the role of gender and other variables in predicting such transitions, that effective prevention of prescription drug problem use can occur.

Epidemiological research also can be improved by including additional data, such as prior and current physical and mental health comorbidities, which may shed additional light on the role of medical history on the nonmedical use of prescription drugs. Studies using appropriate definitions of “dependency” and “abuse” are required to determine the extent to which nonmedical prescription drug use is a “gateway” to prescription drug abuse and dependency. There is little epidemiological knowledge about actual dependency on or misuse of



prescription drugs, or the social, legal, and economic consequences of prescription drug *nonmedical use* and *problem use*. Even less is known about need for and access to treatment for problem prescription drug use, and whether treatment access, modalities of treatment, and even treatment outcomes vary by gender. Finally, the strong associations between daily alcohol use and past-year illicit substance use with past-year prescription drug use beg the need for further examination of nonmedical prescription drug use occurring in conjunction with other substance use.

ACKNOWLEDGMENT

This research would not have been possible without the generous support of the National Institute on Drug Abuse (R29 DA09886). The authors thank Dr. Francois Pradel and Jose Hernandez, both at the University of Maryland Baltimore, for their translations of the abstract.

RESUMEN

A pesar de que se a escrito mucho sobre las diferencias por genero en el uso de alcohol y otras drogas ilicitas, poco se a escrito sobre las diferencias por género en el sobre uso sin autorización médica de drogas resetasadas con potencial de abuso. Aplicando un análisis estadístico de regresión logística a la información de la Encuesta Nacional a Hogares en el Abuso de Drogas, (NHSDA) por sus siglas en inglés, se determinó como el género y otros factores se relacionan al sobre uso sin autorización médica de drogas resetasadas con potencial de abuso durante el año previo a la entrevista. El análisis estadístico reveló que las mujeres estan asociadas a un mayor uso de drogas resetasadas que los hombres, y que esta asociación esta altamente relacionada al sobre uso entre las mujeres de analgésicos narcóticos y tranquilizantes. Otros factores como raza, edad, estado de salud y uso de otras substancias, resultaron ser estadisticamente significativos en su función como agentes predictores para el sobre uso de drogas resetasadas. Los resultados de este estudio van a ayudar a investigadores, agencias reguladoras y proveedores a tener un mejor entendimiento sobre las tendencias por género en el abuso de drogas resetasadas. Entender que el abuso de drogas resetasadas es más prevalente en algunos grupos que en otros ayudará a las autoridades pertinentes a desarrollar planes educativos y de tratamiento específicos a estas poblaciones con alto riesgo de abuso de drogas resetasadas.



RÉSUMÉ

Bien qu'il y ait un grand nombre d'études sur les différences en genre vis à vis de l'utilisation d'alcool et de substances illicites, peu d'études ont examiné les différences en genre dans l'utilisation non médicale des médicaments de prescription. Utilisant les données de la ((National Household Survey on Drug Abuse)) (NHSDA), une régression logistique est employée pour déterminer comment le genre et d'autres facteurs affectent la probabilité d'utilisation non médicale des médicaments de prescription au cours de l'année précédente. L'analyse révèle que les femmes sont plus enclines que les hommes à utiliser les médicaments de prescription, et que cette différence est due principalement au risque accru parmi les femmes d'utilisation non médicale d'analgésiques morphiniques et de tranquillisants mineurs. D'autres facteurs tels que race, âge, état de santé, et utilisation d'autres substances, sont aussi des indicateurs significatifs de l'utilisation non médicale des médicaments de prescription. Les résultats de cette étude vont permettre aux chercheurs, législateurs, et dispensateurs de soins de mieux apprécier les tendances d'utilisation non médicales des médicaments de prescription et de supporter une meilleure approche des différences en genre dans les domaines de la prévention, de l'éducation, et du traitement des utilisations non médicales des médicaments de prescription.

THE AUTHORS



Linda Simoni-Wastila, B.S. Pharm., Ph.D., is an Associate Professor at the University of Maryland School of Pharmacy. Much of the work on this manuscript was conducted while she was a Senior Scientist at the Schneider Institute for Health Policy at Brandeis University. She received her doctorate from Brandeis University, where she was a Pew Health Foundation fellow. Dr. Simoni-Wastila has been conducting research on issues surrounding prescription drug use, misuse, and problem use for the past decade. She is particularly interested in how policies



and regulations aimed at reducing the use of prescription drugs impact the access, quality of life, and the use of substitute drugs and services on vulnerable populations, including women, youth, racial and ethnic minorities, clinically at-risk groups, and elder. Much of her work is funded by the National Institute on Drug Abuse. Other research includes an analysis of gender differences in prescription drug use, risk factors for prescription drug dependency and problem use, and a series of studies examining the medical consequences of implementing a multiple copy prescription program curtailing benzodiazepine use in clinically vulnerable Medicaid recipients.

Grant A. Ritter, Ph.D., is a Senior Scientist at the Schneider Institute for Health Policy at Brandeis University. Dr. Ritter's research area of interest is quantitative methods for health services research. He is currently lead statistician for Brandeis' Prescription Drug Studies, a collection of projects focused on the recent growth in prescription drug use. Between 1995 and 2000, Dr. Ritter was lead statistician for the Alcohol and Drug Services Survey, a national study of substance user treatment.



Gail Strickler, M.A., M.S., is a Research Associate at the Schneider Institute for Health Policy. Ms. Strickler earned a Master's degree in Social Policy and a Master's degree in Management of Human Services from the Heller Graduate School for Advanced Studies in Social Welfare at Brandeis University. She has been a PEW Health Policy Fellow and a National Institute on Alcohol Abuse and Alcoholism (NIAAA) trainee in the doctoral program at the Heller School. Her primary research interests

include program evaluation and systems of health care for vulnerable populations, including individuals with substance misuse disorders and/or disabilities, as well as other underserved persons. Recent projects include Lead Investigator on *Substance Abuse: The Nation's Number One Health Problem*, a substance abuse chart book funded by the Robert Wood Johnson Foundation, a National Institute on Drug Abuse (NIDA) study on the cost-effectiveness of different types of substance misuse



aftercare, and Co-Investigator on a NIDA-funded study of gender differences in prescription drug abuse.

REFERENCES

- American Psychiatric Association. (1987). *Diagnostic and Statistical Manual of Mental Disorders*. Revised 3rd ed. Washington, DC: APA.
- American Psychiatric Association. (1990). In: Salzman, C., ed. *Benzodiazepine Dependence, Toxicity, and Abuse: A Task Force Report of the APA*. American Psychiatric Press.
- Beardsley, R. S., Gardocki, G. J., Larson, D. B., Hidalgo, J. (1988). Prescribing of psychotropic medication by primary care physicians and psychiatrists. *Arch. Gen. Psych.* 45:1117–1119.
- Ben-Akiva, M., Lerman, S. R. (1991). *Discrete Choice Analysis: Theory and Application to Travel Demand*. Cambridge, MA: The MIT Press.
- Bernstein, L. R., Folkman, S., Lazarus, R. S. (1989). Characterization of the use and misuse of medications by an elderly, ambulatory population. *Med. Care* 27(6):654–663.
- Cafferata, G. L., Meyers, S. M. (1990). Pathways to psychotropic drugs. Understanding the basis of gender differences. *Med. Care* April 28(4):285–300.
- Clayton, R. R., Voss, H. L., Robbins, C., Skinner, W. F. (1986). Gender differences in drug use: an epidemiological perspective. In: Ray, B. A., Braude, M. C., eds. *Women and Drugs: A New Era for Research*. National Institute on Drug Abuse Research Monograph Series No. 65., U.S. Government Printing Office.
- Cooperstock, R., Parnell, P. (1982). Research on psychotropic drug use: a review of findings and methods. *Soc. Sci. Med.* 16:1179–1196.
- Cottler, L. B., Robins, L. N. (1983). The prevalence and characteristics of psychoactive medication use in a general population study. *Psychopharm. Bull.* 19(4):746–751.
- Fleiss, J. L. (1982). *Statistical Methods for Rates and Proportions*. 2nd ed. New York: John Wiley And Sons, Inc., pp. 89.
- Gear, R. W., Miaskowski, C., Gordon, N. C., Paul, S. M., Heller, P. H., Levine, J. D. (1996). Kappa-opioids produce significantly greater analgesia in women than in men. *Nat. Med* 2(11):1248–1250.
- Graham, K., Wilsnack, S. C. (2000). The relationship between alcohol problems and use of tranquilizing drugs: longitudinal patterns among American women. *Addict. Behav.* Jan.–Feb. 25(1):13–28.



- Hahn, B. A. (1995). Children's health: racial and ethnic differences in the use of prescribed medicines. *Pediatrics* 95(5):727-732.
- Hallfors, D. (1992). Factors Affecting Longterm Use of Benzodiazepines Among the Elderly. Unpublished dissertation, The Florence Heller Graduate School for Advanced Studies in Social Welfare Policy, Brandeis University, Waltham, MA, October.
- Harrison, E. R., Haaga, J., Richards, T. (1993). Self-reported drug use data: what do they reveal? *Am. J. Drug Alc. Abuse* 19:423-441.
- Hohmann, A. A. (1989). Gender bias in psychotropic drug prescribing in primary care. *Med. Care* May 27(5):478-490.
- Hohmann, A. A., Larson, D. B., Thompson, J. W., Beardsley, R. S. (1991). Psychotropic medication prescription in U.S. ambulatory medical care. *DICP, Ann. Pharmacother.* 25:85-89.
- Iguchi, M. Y., Handelsman, L., Bickel, W. K., Griffiths, R. R. (1993). Benzodiazepine and sedative use/abuse by methadone maintenance clients. *Drug Alc. Depend.* 32(3):257-266.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G. (1985). *Use of Licit and Illicit Drugs by America's High School Students 1975-1984*. Washington, DC: Superintendent of Documents, United States Government Printing Office, DHHS Pub. No. (ADM) 85-1394.
- Jorgensen, T. M., Isacson, D. G. L., Thorslund, M. (1993). Prescription drug use among ambulatory elderly in a Swedish municipality. *Ann. Pharmacoepti.* 27:1120-1124.
- Khandker, R. K., Simoni-Wastila, L. (1998). Differences in prescription drug utilization and expenditures between blacks and whites in the Georgia medicaid population. *Inquiry* 35:78-87.
- Koch, H., Campbell, W. G. (1983). *Utilization of Psychotropic Drugs in Office-based Ambulatory Care*. Hyattsville, MD: National Ambulatory Medical Care Survey, 1980 and 1981, NCHS Advancedata, NCHS.
- Leung, J., Boisse, N. R., Amitay, O. (1995). Sex differences in spontaneous withdrawal following acute benzodiazepine dependence induction. In: *Problems of Drug Dependence, 1994. Proceedings of the 56th Annual Scientific Meeting*. Harris, L. S. ed. The College on Problems of Drug Dependence, 153. Rockville, MD: National Institutes of Health, 237.
- Mellinger, G. D., Balter, M. B., Manheimer, D. I., Cisin, I. H., Parry, H. J. (1978). Psychic distress, life crisis, and use of psychotherapeutics. *Arch. Gen. Psych.* 35:1045-1052.
- Mellinger, G. D., Balter, M. B., Uhlenhuth, E. H. (1984). Prevalence and correlates of the long-term regular use of anxiolytics. *JAMA* 251(3):375-379.



- Olfson, M., Pincus, H. A. (1994). Use of benzodiazepines in the community. *Ann. Int. Med.* 254:1235–1239.
- Parry, H. J., Balter, M. B., Mellinger, G. D., Cisin, I. H., Manheimer, D. I. (1973). National patterns of psychotherapeutic drug use. *Arch. Gen. Psych.* 28:769–783.
- Richard, B. W., Lasagna, L. (1988). Anorectic drugs: drug policy-making at the state level. *J. Clin. Pharm* 28(5):395–400.
- SAS Institute (1990). *SAS Procedures Guide Version 6*. 3rd ed. Cary, NC: SAS Institute Inc.
- Shah, B. V., Folsom, R. E., LaVange, L. M., Wheelless, S. C., Boyle, K. E., Williams, R. L. (1995). *Statistical Methods and Mathematical Algorithms Used in SUDAAN*. Research Triangle Park, NC: Research Triangle Institute.
- Simoni-Wastila, L. J. (1998). Gender and psychotropic drug use. *Med. Care* 36(1):88–94.
- Simoni-Wastila, L. J. (2000). The use of abusable prescription drugs: the role of gender. *J. Wom. Health Gender-Based Med.* 9(3):289–297.
- Substance Abuse and Mental Health Services Administration. (1993). *National Household Survey on Drug Abuse: Main Findings 1991*. Substance Abuse and Mental Health Services Administration, DHHS Publication No. (SMA) 93-1980, May.
- Substance Abuse and Mental Health Services Administration. (1997a). *Preliminary Results From the 1996 National Household Survey on Drug Abuse*. Substance Abuse and Mental Health Services Administration, Office of Applied Studies, July.
- Substance Abuse and Mental Health Services Administration. (1997b). *Substance Abuse Among Women in the United States*. Analytic Series: A-3., Substance Abuse and Mental Health Services Administration, Office of Applied Studies, September.
- Substance Abuse and Mental Health Services Administration. (2000). *Summary of Findings from the 1999 National Household Survey on Drug Abuse*. Substance Abuse and Mental Health Services Administration, Office of Applied Studies, August.
- Svarstad, B. L., Cleary, P. D., Mechanic, D., Robers, P. A. (1987). Gender differences in the acquisition of prescribed drugs: an epidemiological study. *Med. Care* 25(11):1089–1098.
- Swartz, M., Landerman, R., George, L. K., Melville, M. L., Blazer, D., Smith, K. (1991). Benzodiazepine anti-anxiety agents: prevalence and correlates of use in a southern community. *AJPH* 81(5):592–596.



- Szwabo, P. A. (1993). Substance abuse in older women. *Clin. Ger. Med.* February 9(1):197–208.
- Takala, J., Ryynanen, O.-P., Lehtovirta, E., Thrakka, H. (1993). The relationship between mental health and drug use. *Acta. Psych. Scand* 88:256–258.
- The National Center on Addiction and Substance Abuse at Columbia University. (1998). *Under the Rug: Substance Abuse and the Mature Woman*, June.
- Turner, C., Lessler, J., Derore, J. (1992). The Effects of Mode of Administration and Wording on Reporting of Drug Use. In: Turner, C., Lessler, J., Gfroerer, J., eds. *Survey Measurement of Drug Use: Methodological Studies*. Rockville, Maryland: United States Department of Health and Human Services, Alcohol, Drug Abuse, and Mental Health Administration, pp. 177–217.
- Verbrugge, L. M. (1985). Gender and health: an update on hypotheses and evidence. *J. Health Soc. Behav.* 26:156–182.
- Wastila, L. J., Bishop, C. (1996). The influence of multiple copy prescription programs (MCPs) on analgesic utilization. *J. Pharm. Care Pain Symp. Contr.* 4(3):3–19.
- Wells, K. B., Kamberg, C., Brook, R., Camp, P., Rogers, W. (1985). Health status, sociodemographic factors, and the use of prescribed psychotropic drugs. *Med. Care* 23(11):1295–1306.
- Wesson, D. R., Smith, D. E., Ling, W., Seymour, R. B. (1997). Chapter 19: Sedative-hypnotics and tricyclics. In: Lowinson, J. H., Runiz, P., Millman, L. B., Langrod, J. G., eds. *Substance Abuse—A Comprehensive Textbook*. 3rd ed. Williams and Wilkins.
- Willcox, S. M., Himmelstein, D., Woolhandler, S. (1994). Inappropriate drug prescribing for the community-dwelling elderly. *JAMA* 272(4):292–296.



Request Permission or Order Reprints Instantly!

Interested in copying and sharing this article? In most cases, U.S. Copyright Law requires that you get permission from the article's rightsholder before using copyrighted content.

All information and materials found in this article, including but not limited to text, trademarks, patents, logos, graphics and images (the "Materials"), are the copyrighted works and other forms of intellectual property of Marcel Dekker, Inc., or its licensors. All rights not expressly granted are reserved.

Get permission to lawfully reproduce and distribute the Materials or order reprints quickly and painlessly. Simply click on the "Request Permission/Order Reprints" link below and follow the instructions. Visit the [U.S. Copyright Office](#) for information on Fair Use limitations of U.S. copyright law. Please refer to The Association of American Publishers' (AAP) website for guidelines on [Fair Use in the Classroom](#).

The Materials are for your personal use only and cannot be reformatted, reposted, resold or distributed by electronic means or otherwise without permission from Marcel Dekker, Inc. Marcel Dekker, Inc. grants you the limited right to display the Materials only on your personal computer or personal wireless device, and to copy and download single copies of such Materials provided that any copyright, trademark or other notice appearing on such Materials is also retained by, displayed, copied or downloaded as part of the Materials and is not removed or obscured, and provided you do not edit, modify, alter or enhance the Materials. Please refer to our [Website User Agreement](#) for more details.

[Request Permission/Order Reprints](#)

Reprints of this article can also be ordered at

<http://www.dekker.com/servlet/product/DOI/101081JA120027764>