Alcoholism: medical disorder, edited by R. Rose. Raven Press, New York. In press; 1986.
4. Fillmore, K.M., Bacon, S.D., and Hyman, M.: The 27 year longitudinal panel study of drinking by students in college. Final report to NIAAA, contract ADM 281-76-0015, Washington, DC, 1979.
5. Wilsnack, R.W., and Cheloha, R.: Women's roles and problem drinking across the lifespan. Presented at the 35th Annual Meeting of the Society for the Study of Social Problems, Washington, DC, August 1985.
6. Smith, E.M., Cloninger, C.R., and Braderd, S.: Predictors of mortality in alcoholic women: prospective follow-up study. Alcohol Clin Exp Res, 7: 237-243 (1983).

Women's Health: Issues in Mental Health, Alcoholism, and Substance Abuse

Substance Abuse and Women's Health

ELAINE M. JOHNSON, MSW

Ms. Johnson is the Deputy Director of the National Institute on Drug Abuse of the Alcohol, Drug Abuse, and Mental Health Administration, Rockville, MD. The paper is based on her presentation at the National Conference on Women's Health, held in Bethesda, MD, June 17–18, 1986.

Synopsis

The prevalence of illicit drug use is higher among men than women, but new drug use occurs at twice the rate for females as for males. Recent data from emergency rooms and medical examiners support this pattern, but females were more likely than males to report use of tranquilizers, antidepressants, and some nonbarbiturate sedatives. Recent data show that men outnumbered women in drug treatment admissions for all drugs except tranquilizers. However, the 1984 National Institute of Mental Health Epidemiologic Catchment Area Survey shows drug abuse and dependence to be the second most commonly reported disorder for women.

Smoking is the most common form of drug dependence in our society, and it has a major impact on women's health. Lung cancer is now the leading cause of cancer deaths among women. Smoking poses a special risk of coronary heart disease for women using oral contraceptives. The incidence of emphysema among women has also risen sharply. Smoking during pregnancy carries special, serious risks.

Research strongly suggests that the use of marijuana during pregnancy carries significant risks, including low birth weights and fetal abnormalities. Opiate addiction among women is uncommon, but it carries disproportionate health risks for these women and their offspring; infants born of addicted mothers have much higher morbidity and mortality rates than infants in general. Acquired immune deficiency syndrome is a grave risk to women using intravenous drugs and to their children. There are a number of health problems associated with psychoactive drug use among elderly women.

In addition to research, the National Institute on Drug Abuse has focused a number of its activities on the special problems and needs of women. The Institute is collaborating with the health care community to place increased emphasis on prevention and treatment services for women and is working with organizations in the public and private sector to ensure that current information about drug use is effectively disseminated.

THE SUBJECT OF SUBSTANCE abuse among women deserves our attention. In fact, it is one of the most significant health issues facing both men and women today. The National Institute on Drug Abuse (NIDA) is eager to share its knowledge about the problem and to learn from other sources as well.

Since NIDA was established in 1974, it has focused on a number of issues related to women and drug abuse. Those issues have changed over the years, but the interest has remained strong. Current authorizing legislation clearly states that NIDA must increase its efforts on drug abuse research and services relating to women. Every effort is being made to do that, given Federal budgetary restraints. There is a great deal more to do in this area, for NIDA and many other organizations.

Dimensions of the National Problem

To provide a picture of the drug abuse problem, this discussion begins with an overview of drug use and abuse in general. The Institute supports several national epidemiologic surveys. These studies include a National Household Survey on Drug Abuse (NHSDA), usually conducted every 3 years, and an annual nationwide survey of drug use among high school seniors. NIDA also maintains a nationwide drug abuse monitoring system known as DAWN (Drug Abuse Warning Network) in hospital emergency rooms in 26 large urban areas across the United States. The emergency room data are supplemented in many cities with a medical examiner system that charts trends in deaths caused by or related to drug abuse.

While the household and high school surveys represent the distribution of drug use and abuse in our society, DAWN data represent the health consequences which result from drug use.

All of these surveys indicate that although the number of Americans using drugs has somewhat stabilized, levels of drug use remain unacceptably high. For example, the latest NHSDA, completed in 1985, reveals that 18.2 million Americans had used marijuana within 30 days, 5.8 million had used cocaine within 30 days, and 2.6 million had used sedatives without a prescription within 30 days.

According to the High School Senior Survey, the use of most drugs continued to decline gradually in 1985. Cocaine use was a notable exception; it remained at peak levels among students, despite increased public attention to its dangers.

Data from NIDA's Drug Abuse Warning Network show that between 1982 and 1986 there was a fourfold increase in the number of mentions of cocaine emergencies and of medical examiner reports of cocaine-related deaths. The number of cocaine-related deaths reported by medical examiners increased from 202 in 1982 to 812 in 1986. NIDA believes we are now seeing the tragic results of the sharp rise in cocaine use in the late 1970s and early 1980s.

Incidence of Drug Use Among Women

All of these surveys identify information by sex and, therefore, allow comparisons of various drug abuse measures by sex. NIDA has programmed its data systems to look at gender as a variable and plans to do retrospective and current searches on race and gender differentials in the survey data.

Table 1. Current use of drugs by sex[1] among respondents in the National Household Survey on Drug Abuse, 1985 (percentages)

Drug type	*Females*	*Males*
Marijuana	7.0	12.3
Cocaine	2.0	3.9
Hallucinogen	*	0.8
Sedatives	0.5	1.2
Tranquilizers	1.0	1.2
Stimulants	0.8	1.9
Analgesics	1.1	1.1

[1] Current use defined as use at least once in the past month. * Less than 0.5 percent.

To date, the surveys show that the prevalence of illicit drug use is higher among men than women. For example, data from the NHSDA (1985) indicate that among persons 12 years and older living in households in the United States, females were less likely than males to be current users of an illicit drug. Overall, 9.3 percent of females, compared to 15 percent of males, reported such use. These figures include having at least tried, in the month prior to the survey, an illicit drug such as marijuana, heroin, hallucinogens, or cocaine, or having used for nonmedical purposes a prescription psychotherapeutic drug such as tranquilizers, sedatives, stimulants, or analgesics.

For each of the eight major drug categories shown in table 1, the percent of females reporting current use of each drug group listed was lower than that reported by their male counterparts. Nevertheless, among 18- to 34-year-old women (that is, in the prime childbearing years), 30 percent had used an illicit drug at least once in the past year and 18 percent had used an illicit drug at least once in the past month.

Estimates of the prevalence of drug abuse obtained from the NHSDA must be viewed as conservative, since certain potentially high risk groups may not be represented, such as persons with no fixed address, college students, and persons in institutions such as prisons. Although surveys keep confidential the identity of the subjects, women with children often do not report drug use for fear of losing custody of the children.

Given these constraints, it should be noted that the 18- to 25-year age group had the highest prevalence of drug use (table 2). Within this age group, the percent of current male drug users exceeded the percent of current female users in every illicit drug use category except tranquilizers (table 3). However, recent trends indicate that this sex difference

Table 2. Current non-medical use of drugs by sex and age among respondents in the National Household Survey on Drug Abuse, 1985 (percentages)

Age	Females	Males
12–17 years	13.4	16.6
18–25 years	21.0	30.0
26–34 years	15.4	26.2
35 years or older	2.9	5.1
Total	9.3	15.0

Table 3. Current use of drugs among 18 to 25 year-olds by sex, respondents in the National Household Survey on Drug Abuse, 1985 (percentage)

Drug type	Females	Males
Marijuana	17.0	26.5
Cocaine	6.2	9.0
Hallucinogens	*	2.8
Sedatives	0.7	2.4
Tranquilizers	1.1	2.1
Stimulants	1.9	5.6
Analgesics	1.5	2.4

* Less than 0.5%

may be disappearing. While past month and lifetime prevalence of marijuana use decreased for both males and females between 1979 and 1985, these decreases were much larger for males. This suggests that incidence rates during that period may have been higher for females than for males.

Incidence of illicit drug use can be measured by using data on first use of marijuana in the past year, since marijuana is usually the first illicit drug used. Tables 4 and 5 present two measures of incidence from the 1982 NHSDA. Similar data from the 1985 NHSDA are being analyzed.

Table 4 shows that new use as a percent of the population occurred at twice the rate for females as for males. This was true for both teenagers and young adults. The incidence rates shown in table 5 represent new use as a percent of the population at risk, which excludes those who have already used marijuana. Because prevalence was higher for males than females, the population at risk was smaller for males relative to females. Nevertheless, both measures suggest a substantially greater incidence for females than for males.

If this difference in incidence rates continues, marijuana use prevalence rates for women could eventually equal, or possibly surpass those of men, repeating the unfortunate pattern of cigarette smoking in our society. While, overall, male smokers still outnumber female smokers, more young women are smoking now than young men.

The data from DAWN support the pattern seen from the survey data. For example, according to 1985 DAWN emergency room data, females were more likely than males to report tranquilizer use as related to their emergency room visit. Specifically, 9 percent of females' episodes related to diazepam (Valium) use, versus 6.7 percent of males' episodes.

The same was true for antidepressants, such as Elavil (2.9 percent versus 1.4 percent), some nonbarbiturate sedatives, and over-the-counter sleep aids. Treatment admission data tell much the same story. For instance, 1983 client treatment data, based on information from 23 States and the District of Columbia, indicated that men outnumbered women in admissions for all drugs except tranquilizers.

In addition, although males predominate in surveys of drug abuse, the 1984 National Institute of Mental Health Epidemiologic Catchment Area Survey shows drug abuse and drug dependence to be the second most commonly reported disorder for women. From the female point of view, drug abuse is a serious risk to health and quality of life. The large number of women who now use drugs—both licit and illicit—and their possible vulnerability to reproductive effects should make drug use among women a serious public health concern for all of us.

Research on Women and Drug Abuse

NIDA is primarily a research institute. Current research activities and findings which have special relevance to the topic of drug abuse among women begin with the most common form of drug dependence in our country—cigarette smoking—which is also the chief avoidable cause of death in the United States.

As with other forms of drug abuse, patterns of cigarette use among men and women have varied significantly. Men began smoking intensively during World War I and women during World War II. Men's cancer death rates began to rise in the 1930s and women's in the 1960s. In 1985, for the first time, lung cancer surpassed breast cancer as the leading cause of cancer deaths among women. Smoking also poses a special risk of coronary heart disease for women. Those who smoke and use oral contraceptives are 10 times as likely to suffer a heart attack as women the same age who do not smoke and do not use birth control pills. Although emphy-

sema occurs more commonly in men than in women, it is increasing among women. In the past 10 years, its incidence has nearly tripled among young women and more than doubled among older women.

Smoking during pregnancy poses special, serious risks. The Office on Smoking and Health of the Public Health Service reports that miscarriages, preterm births, low birth weight babies, and fetal and infant deaths all occur more frequently when a woman smokes during pregnancy. Some researchers found that up to 14 percent of all premature births are caused by a mother's smoking and that infants born to women who smoke during pregnancy are nearly half a pound lighter, on the average, than babies born to nonsmokers. Other studies indicate a less clear relationship between smoking and these problems, possibly because smoking is often an indicator of a range of high-risk behaviors, high-risk health status, and stress.

Maternal smoking has also been found to be strongly associated with sudden infant death syndrome, which in the United States claims more than 6,000 lives a year and is the leading cause of death in children 1 to 12 months old. Babies exposed to cigarette smoke also incur an increased risk of bronchitis and pneumonia. Later on, smoking may have still another effect on our children. Of all teenagers who smoke, three-quarters come from families where one or both parents smoke. Here, as in so many other cases, a mother's or father's example is extremely important.

A good deal of NIDA's research in the area of smoking has focused on why, in the face of this overwhelming evidence of the risks involved, people continue to smoke cigarettes. While a number of factors are involved, the research clearly indicates the addictive nature of smoking. Data from a recent NIDA-funded study indicate that men metabolize nicotine faster than women; therefore, women may need to smoke less than men to achieve the same body level of nicotine. Preliminary data from other studies suggest that women are "more" addicted to nicotine than men, find cessation more difficult to achieve, and report more severe withdrawal symptoms than their male counterparts.

Despite the difficulties involved, many people have been persuanded to quit smoking and substantial progress has been made in reducing smoking in the past 20 years. The percentage of males who smoke has dropped from 50 to 33 and the percentage of women smokers is now below 30. The unfortunate fact is, however, that more high school girls are smoking now than boys, although both boys and girls are smoking less than 10 years ago. In addition,

Table 4. Percentage of population using marijuana for the first time in the past year among respondents in the National Household Survey on Drug Abuse, 1982

Age group	Males	Females
12–17 years	4.0	8.0
18–25 years	0.7	1.4

Table 5. Incidence rates for marijuana use among respondents in the national Household Survey on Drug Abuse, 1982 (percentages)

Age group	Males	Females
12–17 years	5.3	9.6
18–25 years	2.2	3.3

smokeless tobacco is now being used by increasing numbers of young women as well as young men. Because quitting is so difficult, any real chance to achieve a smokeless society rests on our ability to persuade young people not to take up smoking. As with other forms of substance abuse, prevention may be our best line of defense.

To prevent duplication of effort, some of NIDA's initiatives in tobacco research are being transferred to the National Cancer Institute. Nevertheless, smoking continues to be included in NIDA's ongoing preventive intervention research, and the Institute is looking specifically at age and gender factors in the development of successful prevention programs.

The largest group of women who abuse illicit drugs is also probably the most diverse. These are marijuana users. At the time of the 1985 NHSDA, the total number of American girls and women who had tried marijuana exceeded 26 million, and 7 million reported current use. The public health implications of these statistics are not completely clear. Our studies indicate that the acute adverse effects of marijuana use do not occur any more frequently in women than in men. Chronic marijuana use may affect the respiratory system and cardiac function; marijuana's effect on the reproductive and endocrine systems of both males and females is also being investigated by NIDA-supported researchers. So far, the adverse effects observed in animals have not been seen in long-term, well-controlled studies in humans, probably because of the development of tolerance to the effects of marijuana. However, polydrug use by women will certainly disrupt their endocrine functions.

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We are concerned about the potential effects of marijuana on the offspring of women using this drug. Marijuana's principal psychoactive ingredient, THC, readily crosses the placental barrier and must be regarded as a drug with potential impact on the developing fetus. One study of 1,690 mother-infant pairs done in Boston suggests that marijuana use during gestation is associated with low birth weights and fetal abnormalities resembling the fetal alcohol syndrome. While the problems of controlling for other confounding variables such as smoking, maternal health history, diet, and other drug use make it difficult to draw firm conclusions regarding the effect of marijuana on the fetus, the research strongly suggests that its use during pregnancy carries significant risks.

Opiate addiction among women is uncommon, but it is important because the health risks for these women and their offspring are quite disproportionate to the numbers involved. Currently, only one-fifth to one-fourth of the opiate addict population is believed to be women; most opiate abuse by females remains hidden.

Women who are opiate-dependent are distinguished from male narcotic addicts in several ways. They are likely to regard themselves as more socially deviant than their male counterparts and have generally poorer self-images. Unlike men, most women are initiated into opiate use by the opposite sex. Women are also more likely to use drugs in a conscious attempt to relieve their emotional problems rather than primarily for pleasure.

Women addicts are more deeply entrapped, at earlier ages, by social and economic conditions, and they have fewer ways out of the addiction pattern. Half of the women in treatment for opiate addiction have children, and many female opiate addicts avoid treatment because they fear losing custody of their children. Opiate-dependent women are more likely than addicted men to seek treatment for medical complications of drug use rather than for the underlying drug dependency. Neglect of normal hygiene, lack of routine health care, and the medical and physical hazards of frequently supporting their opiate habits by prostitution increase the incidence of such problems as chronic infections, anemia, hepatitis, hypertension, veneral disease, and urinary tract and gynecological disorders. Research also indicates that opiate-dependent women have higher risks than other women of developing cervical and uterine malignancies and gonorrhea.

Pregnancy can be especially dangerous for the woman addict and her offspring due to her frequently poor diet, lack of adequate prenatal care, and poor general health—in addition to the drug use itself. Serious obstetrical complications of pregnancy for addicted women include spontaneous abortion, premature placental separation, breech presentation, intrauterine death, premature labor, and premature rupture of the membranes. Ten to fifteen percent of drug-dependent women experience toxemia of pregnancy; nearly half of those addicted to heroin and lacking prenatal care have premature deliveries.

Infants born of addicted mothers have much higher morbidity and mortality rates than infants in general; the death rate in these infants is four times higher. They are much more likely to have congenital anomalies, to show growth retardation, and to experience other medical complications—one of the most signficant being neonatal opiate withdrawal. Although there may be greater than normal risks for the offspring of methadone-maintained mothers, the risks of this medically supervised opiate treatment group are much lower than those for infants born to heroin-addicted mothers.

Another grave risk to the children of drug-using women has recently emerged in the form of pediatric acquired immunodeficiency syndrome (AIDS). Children represent a very small fraction of the individuals with AIDS; however, 80 percent of these children were exposed to the virus through the intravenous drug use of their parents. While heroin addicts make up most of this group, we should remember than any intravenous drug use which involves the sharing of needles places the user at risk for contracting and further spreading the potentially deadly virus.

NIDA has long supported research on the subject of opiate use during pregnancy and continues to do so. Greater research efforts are needed to define the mechanisms governing the placental drug transport, fetal drug disposition, and the elicited fetal effects. Two current research projects are using pregnant lambs to investigate the effects of maternal narcotic use on the fetus. Preliminary findings suggest that intrauterine opiate exposure disturbs the normal behavioral states of the fetus and that opiate with-

drawal presents a severe physiological stress to the fetus.

The effects on pregnant women and their offspring of drugs other than opiates are a current area of focus for NIDA. Recent reviews of findings in this area have resulted in two monographs from NIDA, "Consequences of Maternal Drug Abuse" and "Prenatal Drug Exposure: Kinetics and Dynamics". PCP and cocaine are two drugs of growing concern in this area, and NIDA has recently awarded some new grants for studies on PCP and cocaine use by pregnant women. Although the investigators are primarily focusing on drug exposure in utero and developmental outcome of the infants, pharmacologic and biological factors are being assessed. In one study of PCP, an effort will be made to determine genetic factors of mother versus father in terms of their individual drug use and effects on the infant.

A new initiative on women is addressing interrelationships among factors linked in drug use-abuse and precocious sexual activity, pregnancy, and parenthood among single adolescents. A technical review was conducted in 1985 on "Drug Abuse and Adolescent Sexual Activity, Pregnancy and Parenthood". It will be published as an NIDA research monograph in Fiscal Year 1987.

Another group of female drug users who merit special attention are elderly women. Although the elderly comprise only 11 percent of the population, they receive 25 percent of all prescriptions. They also make significantly greater use of prescribed psychoactive drugs such as tranquilizers, sedatives, antidepressants, and antipsychotics. More women are at risk for potential drug misuse not only because of the predominance of females among the elderly, but also because they are much more likely to be given these drugs than are elderly men. There are a number of health consequences associated with psychoactive drug use in the elderly, and they were reviewed by NIDA several years ago. They include suicide, chronic dependency and addiction, affective distrubance, insomnia, overdose, and impairments of cognitive and motor function, in some cases so severe that they may lead to institutionalization. There is a growing consensus that most physicians are inadequately trained in geriatric pharmacology and particularly in the special problems of older women. The metabolism or disposition of many drugs are changed in the elderly female.

Although the evidence suggests problems of misuse rather than of deliberate abuse and addiction in this older population, some experts believe that this situation may change. As more people who were drug abusers at earlier ages enter the ranks of the elderly, they may be more likely to abuse the psychoactive drugs prescribed for them.

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In addition to these special areas of interest, NIDA is now attempting to incorporate the concerns and health needs of women into the Institute's overall research activities. Participants in technical and scientific review are now being asked to identify particular implications for women in their particular research areas.

The 1985 technical review on gender as a factor in substances abuse has been published as NIDA Research Monograph No. 65, "Women and Drugs: A New Era for Research" (Ray, B.A., and Braude, M.C., Eds., 1986). This review and subsequent publication are important steps in the process of exposing the scientific community to new ideas and knowledge about the relationship between gender and drug abuse.

Other areas in which we are now soliciting new grants are prevention techniques for drug use-abuse among women, and the relationships between dietary factors and drug abuse, including factors which may affect differences in male and female drug use and effects. Similarly, in current neuroscience and neuroendocrine research supported by NIDA, grantees are encouraged to look specifically at gender differences and at the effect of drugs of abuse on sexual maturation and development. The emerging area of gender research that indicates differences in the male and female brain is of particular interest to NIDA, as all adrugs of abuse function in the central nervous system. How gender differences influence risk or treatment for drug abuse is a question still to be answered.

Other Activities Relating to Women

NIDA's national leadership in drug abuse prevention and treatment goes beyond its lead role in funding and carrying out research in these areas. A major part of the Institute's mission is to provide guidance and assistance to drug abuse prevention and treatment efforts at the State and community

levels. In carrying out this responsibility, NIDA pursues a number of different but related activities. They include technical assistance to groups in both the public and private sector in the form of workshops, conferences, and seminars, as well as direct on-site assistance; identification and—through limited funds for demonstration projects—replication of model prevention and treatment programs; dissemination of prevention and treatment research findings to schools, parents groups, primary health providers, and law enforcement personnel through publications and workshops; and public education through the development of written information and national media campaigns. All of these activities build on the knowledge gained through our research activities, and a number of them are currently focusing on the special problems and needs of women.

For example, NIDA has developed a bibliography on women and drug abuse and a mailing list of programs interested in this area. The Institute has also been working on an Alcohol, Drug Abuse, and Mental Health Directory on Treatment and Prevention Resources for Women. In addition, NIDA has conducted women and drug abuse workshops at national conferences to transmit research findings on treatment and prevention to State and local policymakers and service providers.

During the past year, NIDA has conducted a series of regional workshops, Current Issues in the Treatment of Chemically Dependent Women. Recognizing that these women have different problems and needs than their male counterparts, NIDA developed the training course on providing drug and alcohol treatment to women. Staff members and administrators make available current information on relevant topics, including co-dependency; pregnancy and parenting; strategies for AIDS prevention; benzodiazepine dependence and detoxification; cocaine; and common coexisting disorders, such as agoraphobia, bulimia, and depression. A training manual was developed for the course.

Many people fail to appreciate that there are significant numbers of women who have AIDS, are infected with the AIDS virus, or are at high risk for infection. Many of these women have a history of intravenous drug use. Others are the sexual partners of IV drug users.

NIDA has developed training materials and programs for State drug abuse agencies, drug treatment programs, criminal justice detention systems, and other relevant health care agencies which encounter intravenous drug users or their families. These training materials include a special module on AIDS and women, which focuses not only on women with AIDS, or at risk for developing the disease, but on the special role of women as caregivers for AIDS patients. A new, expanded module on women is currently being designed, as are a series of videotapes aimed at female drug abusers both in and out of treatment, and the females who are sexual partners of intravenous drug abusers.

NIDA will be supporting a model AIDS outreach and education/prevention program specifically aimed at prostitutes and the sexual partners of intravenous drug abusers. In addition to this 3-year, 3-city project, NIDA will be targeting women in all of its comprehensive AIDS community outreach demonstration projects.

Finally, NIDA is collaborating with the health care community to place increased emphasis on prevention and treatment services for women, especially the primary health care community. To accomplish this, the National Institute of Alcohol Abuse and Alcoholism and NIDA have awarded contracts both to the American College of Obstetrics and Gynecology and the American Nursing Association to develop and disseminate materials on women and drug abuse. Work with the March of Dimes and other organizations in the public and private sector on an initiative is designed to ensure that current information about the relationship between drug use, including the use of cigarettes and alcohol, is more effectively disseminated, especially to teenage mothers.

Summary

NIDA recognizes that the history of drug abuse research shares with other sciences a relative paucity of knowledge about females and about gender effects. To rectify this, NIDA is now deliberately gearing research projects to look at gender as a potentially important experimental variable. In planning our future research agenda concerning women, close attention will be paid to the issues which emerge from this Conference on Women's Health.