Medication use Across the Life-span in the Seattle Longitudinal Study

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Abstract

Regular medication usage across the life-span of 1815 subjects who ranged in age from 22-94 (M=59.7) in the Seattle Longitudinal Study was examined. Subjects reported all medications taken for at least one month prior to the testing session. Demographic and lifestyle information were also available. Subjects were recruited from a Health Maintenance Organization (HMO) in the Seattle area. Almost 40% of the sample reported no medication use, while the remaining subjects reported using 1.65 (range 1-12) drugs regularly. Central nervous system agents were the most commonly reported (N=573) drug category, followed by cardiovascular drugs (N=544), and hormone synthetic substitutes (N=535). A significant difference was found between age groups and the number of drugs used. The older adults were found to use more drugs. A significant relationship was also found between gender and the number of drugs used and between years of education and the number of drugs used.

Medication Use Across the Life-span in the Seattle Longitudinal Study

Previous research suggested that older adults, on average, regularly consume more prescribed and over-the-counter medication than younger adults (HHS Inspector General, 1989a; Public Policy Institute of AARP, 1991). Furthermore, there is evidence that women use a greater number of drugs than men (U.S. Department of Health and Human Services, 1992). The present study examined the frequency of drug usage across the life-span. In addition, demographic variables including gender, education, marital status, and income were examined in relationship to overall drug use in a sample of 1815 subjects from the Seattle Longitudinal Study (SLS). It was hypothesized that the use of medications would be different across age groups with the oldest adults using more medications than younger adults. In addition, it was believed that females were more likely to use more medications than males. The use of psychotropic medication was also examined to look for differential patterns of use based upon gender and age.

Age as a Factor in Drug Use

Previous studies indicate that the elderly consume a disproportionate share of prescription drugs (Koch, 1987; Lipton & Lee, 1988). In 1988, those 65 years and over constituted approximately 12% of the total United States population and accounted for 35% of the prescription drug expenditure for that year (Koch, 1987; Lipton & Lee, 1988). The relationship between increased age and higher drug use may be attributable to the fact that approximately 80% of the persons over 65 years of age have one or more chronic illnesses and an accompanying disability (Rice & Estes, 1984). While inconsistencies exist regarding the types and the quantity of medication used by the older population (Cartwright, 1990; Ostrom, Hammarlund, Christensen, Plein & Kethley,

1985), the majority of the studies conclude that the number of medications taken show a steady age-related increase (HHS Inspector General, 1989b; Stewart, 1987).

Drugs Prescribed Most Often

A survey conducted by the National Center for Health Statistics showed that of 2600 different drugs and drug categories prescribed by physicians in 1980, 8% of drugs and drug categories (n=200) accounted for nearly 2/3 of all drug use (Koch, 1982). The three most frequently prescribed categories were central nervous system drugs (e.g. tranquilizers) which accounted for 16.3% of drug use; anti-infective agents (e.g. antibiotics), which constituted 15.4% of the total drug use; and cardiovascular drugs (e.g. cardiac drugs, antihypertensive drugs) which accounted for 9.5% of drug use. Medicines most frequently dispensed to ambulatory adults are cardiovascular medicines, diuretics, central nervous system agents, modifying drugs, anti-infective drugs, analgesics, and hormone supplements (Public Policy Institute of Retired People, 1991; Baum, Kennedy, Knapp, Faich, & Ariello, 1986).

Frequency of Prescription Drug Use

The frequency of prescription drug use by adults varies depending on geographic region (e.g. urban or rural), health status (nursing home patients or ambulatory), and methods used to obtain drug use information (e.g. interviews or national expenditures). Ostrom, Hammarlund, Christensen, Plein and Kethley (1985) conducted a study with 183 independently living, low-income older adults. The median and mean age of the interviewees was 77 years old and 75% of the subjects were currently using prescription drugs. Respondents regularly used an overall average of 4.5 prescribed drugs. Other researchers found individuals using, on average, three different medications at any one time (Lamy, Salzman, & Nevis-Olesen, 1992; Raffoul, Cooper, & Love, 1981). Helling, et

al. (1987) examined a rural population in Iowa and found that 88% of the older adults took at least one medication and the mean of number of medications taken regularly was 2.87. Guttman (1977) found a lower use of medications by older adults with an average of 1.6 prescription medications used and 50% of the sample used no prescription medicines.

Use of Psychotropic Drugs

Non-institutionalized older adults have been assumed to be heavy users of psychotropic drugs; however, studies have found a varying degree of psychotropic drug use in the elderly (Ostrom et al, 1985; Stephens, Haney, & Underwood, 1982). Stephens and his colleagues (1982) found that a majority of elderly adults do not use these drugs. In fact, Venner, Krupka, and Climo (1980) found that only 11% of older individuals use psychotropic medicine. However, Ostrom et al. (1985) found 25% of the older adults surveyed used psychoactive drugs. Furthermore, psychotropic drug use has been found to be greater among the middle-aged and older persons than among those less than 50 years of age (Mellinger & Balter, 1981).

Gender as a Factor in Drug Use

Higher levels of drug use have been reported for females than males (Chrischilles et al, 1992). This finding still holds after symptomatology and frequency of physician consultations has been controlled (Whittington, 1982). Whittington (1982) compared older females use of prescribed medication with that of older males and found that women took significantly more drugs than did men. Data published by the National Center for Health Statistics: National Ambulatory Medical Care Survey also reports that a greater number of psychotropic drugs are used by women than men (Koch & Smith, 1985).

Study Objectives

The SLS provides a unique opportunity to examine the medication use of members of a HMO. This study is unique for two reasons. First, the recent Clinton health reform proposal indicates that HMOs will become a more frequent means of providing health care. Second, it is possible that members of HMO are more likely to be healthier than non-members as a result of their relatively easier access to medical care. Consequently, it is appropriate to examine the medication usage in a HMO setting.

Hypotheses

1). Older adults were expected to consume more medication than younger adults.

2). Central nervous system drugs, cardiovascular drugs, and anti-infective agents were hypothesized to be overall the most common prescribed drugs.

3). Women were expected to consume more medications than men.

4). Individuals with higher levels of education and higher incomes would use less medications than individuals with lower education and lower income.

5). Women were expected to be more likely to use psychotropic medications than men.

Methods

Subjects

The present study prescribed medication use in a sample of 824 males and 991 females (N=1815) with a mean age of 59.7 (range 22-94) at the time of testing in 1991. The sample represented a wide variety of occupational backgrounds and education levels M=14.83 years of education (SD=2.93), and had a mean income of $25,000

(SD=4.08). Subjects were drawn from the SLS, a longitudinal-sequential study of psychometric intelligence in adulthood (Schaie, 1983, 1993). Subjects were selected randomly by gender and age/cohort from the membership of a large (HMO) in the Seattle Area.

Procedures and Measures

Subjects were asked to bring all medications taken regularly for at least onemonth to the testing session. The name of the medication, dosage level, subjects' perceived purpose for the medication, and physicians' instructions were recorded. Each medication was assigned a drug code based on the American Hospital Formulary Service (1991) coding scheme. Demographic and lifestyle information including gender, age, education, income, occupation, and marital status were obtained from the Life Complexity Inventory (Gribbin, Schaie, & Parham, 1980).

Results

Drug use was examined for four age groups, young adults (n=202; 22-35 years of age), middle aged adults (n=542; 36-56 years of age), young-old adults (n=529; 57-70 years of age), and old-old adults (n=545; 71 and over). Subjects were classified by frequency of drug use. Given the small frequencies of excessive drug use, subjects who used seven or more drugs were combined together and chi-square analyses were used to examine relationships.

No regular medication usage was reported by 40% of the sample (n=768). The average number of drugs used by the remaining sample was 1.68 medications. There was a significant difference in number of drugs used according to age group ($X^2[21]=203.01$, $p<.0001$). Young adults used, on average, less than one drug M=0.65,

(SD=1.05, n=202), middle-aged adults used M= 1.12 (SD=1.64, n=542), the young-old adults used M=1.94 (SD=1.99, n=529), and the oldest old took on average M=2.28 (SD=2.09, n=545) medications regularly (see Figure 1). The most commonly used drugs were central nervous system agents (n=573), followed by cardiovascular drugs (n=544) and hormone synthetic substitutes (n=535) (see Table 1).

Insert Figures 1 about here

Insert Table 1 about here

A significant relationship between gender and number of drugs consumed was found (X^2[7]=53.74, p<.0001). The mean number of drugs taken by females was M=1.91 (SD=2.03) and for males M=1.35 (SD=1.77)(see Figure 3). There was also a significant relationship between the level of education and the number of drugs consumed (X^2[7]=46.66, p<.0001). Those individuals who had more than a high school education used fewer drugs (M=1.48, SD=1.81) than those with less than a high school education (M=2.12, SD=2.15) (see Figure 4). A significant relationship existed between drug use and income (X^2[7]=48.97. Those with incomes lower than $25,000 used more medications (M=1.98, SD=2.09) than those with higher incomes (M=1.4, SD=1.76) (see Figure 5).

Insert Figures 2-4 about here

A significant relationship between marital status (i.e., single, divorced, widowed, or married) and the number of drugs taken (X^2[21]=54.70, p<.0001) was found. Those

individuals who were widowed took more drugs than those in any other marital status category (M=2.26, SD=2.19) (see Figure 6).

Insert Figure 5 about here

Almost 25% of the sample (n=451) used at least one psychotropic medication. There was no significant difference between gender and use of psychotropic medication. However, of the 451 subjects who used psychotropic medication, 57% were female (n=257) and 43% were male (n=194).

Discussion

As expected, the present study found significant age differences in medication use. Older adults used more medications, on average, than younger adults. Expectations that women used more medications than men were also met. In addition, those individuals who had less than a high school education and those with incomes lower than $25,000 used more medications than their respective counterparts.

The present study found reports of medication usage lower than those reported by other studies (Helling et al., 1987; Lamy et al., 1992; Ostrom et al., 1985; Raffoul et al., 1981). Guttman's (1977) household survey of older persons was more comparable to our findings with respondents reporting, on average, 1.6 prescriptions. Guttman's results could be due to almost one half of the sample using no prescription medication. Nonetheless, we found an overall average use of 1.68 medications across all four age groups and for the old-old group, 2.28 drugs were found. A large number (40%) of subjects in the present investigation reported no medication usage. What is unique

about this study in comparison to other studies (e.g., Guttman, 1977) is that respondents usually did report nonprescription drugs.

In general, women of all ages used more prescribed drugs than men. Women are more likely to have certain types of illness, problems, and conditions amenable to drug therapy (e.g. urinary tract, infection, hypertension, and menopause) (Lipton & Lee, 1988). Nonetheless, little research has been done to determine the reasons for this phenomenon.

Consistent with Ostrom et al. (1985), we found that 25% of those subjects reporting medication usage used at least one psychotropic medication. However, unlike other studies (Koch & Smith, 1985) we did not find any significant differences between gender and number of psychotropic medication used. It is possible that the low number of psychotropic medication can be attributed to the subjects being healthier than comparable populations.

The low drug use found across the life-span in this sample may be attributed to sample selection. HMOs may influence better health practices in the form of preventive behaviors (Luft, 1981) and this may be associated with less need for medical attention. In addition, since this population is relatively well-educated and financially affluent, these variables could also be related to better health practices and lifestyles which may be associated with lower medication use. Researchers have begun to examine the difference in health outcomes between HMOs and fee-for-service institutions. Ware and colleagues (1986) reported that those in the top 40% of the income distribution in HMOs had significantly better ratings of health as compared to members of fee-for-service institutions.

Another important issue is the method in which drug usage was obtained. Although subjects may have purchased many other drugs, they were asked to only report those drugs that they were using regularly for at least one month. Future studies that examine medication usage may want to distinguish medication use based upon the amount of medication purchased and the number used daily.may want to explore individuals' actual use of medication, similarly to the SLS, and not use data on amount of money spent on medication.

In conclusion, investigations have obtained different pictures of medication use as a result of methodological differences including sample size, sampling frame, geographic location, definition of drug use, and dependence on participant recall. Participants have also differed in urban/rural residence, tendency to use available health services, and personal health status. Our findings pertain to an urban community with easy access to health services and is composed of 75% of the upper SES structure. Further research on medication usage should explore use in more diverse populations.

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Table 1. Frequency of Drugs Reported

Drug Category	Frequency
Central Nervous System Drugs	573
Cardiovascular Drugs	544
Hormone Synthetic Substitutes	535
Electrolytic, Caloric, and Water Balance Drugs	391
Antihistamine Drugs	205

FIGURE 1. AVERAGE NUMBER OF MEDICATION USED BY AGE GROUP

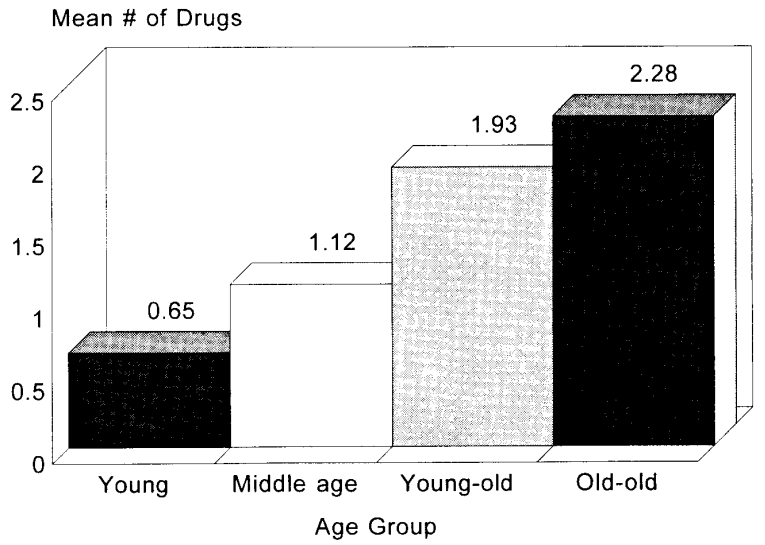

FIGURE 2. AVERAGE NUMBER OF MEDICATION USED BY GENDER

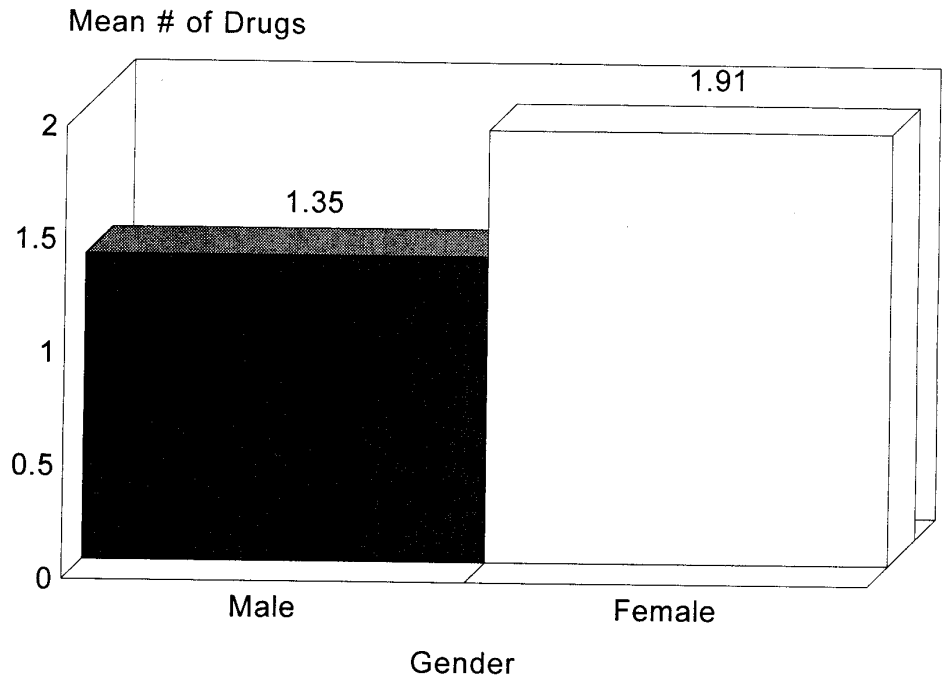

FIGURE 3. AVERAGE NUMBER OF MEDICATION USED BY INCOME

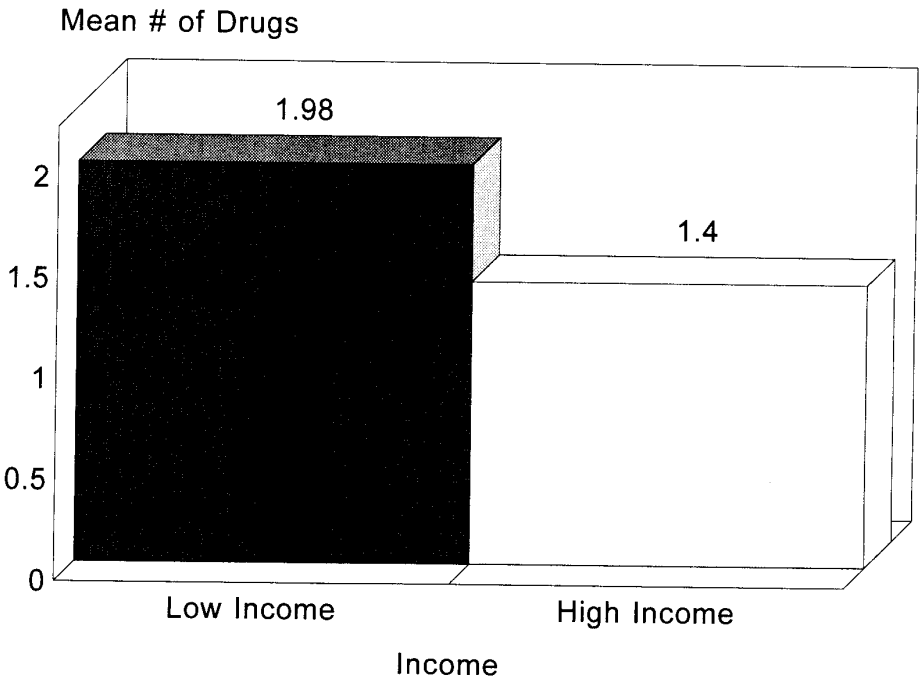

FIGURE 4. AVERAGE NUMBER OF MEDICATION USED BY EDUCATION

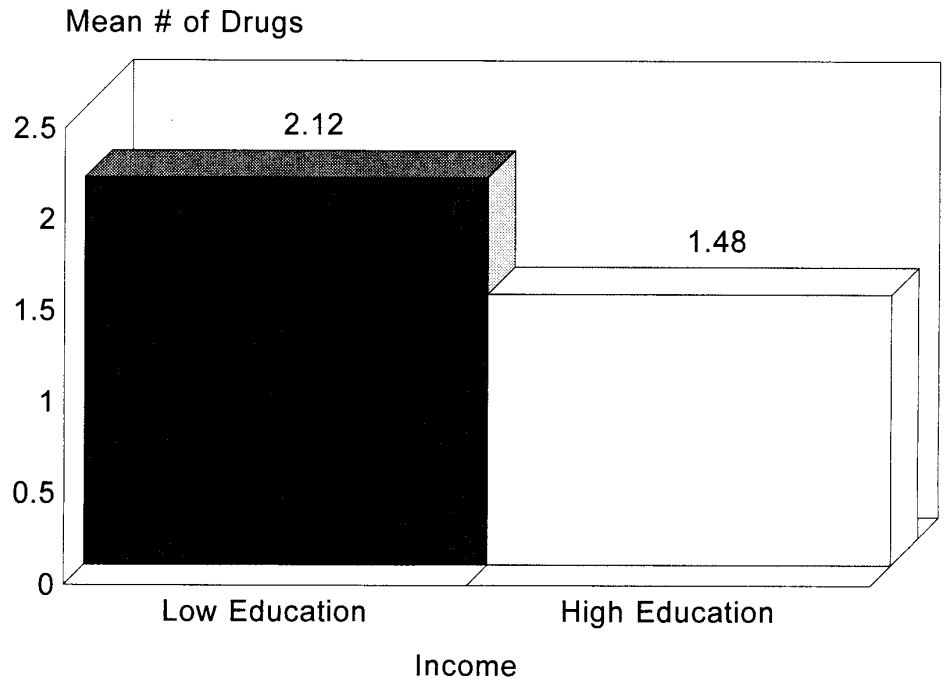

FIGURE 5. AVERAGE NUMBER OF MEDICATION USED BY MARITAL STATUS